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STUDIES OF TYPOGRAPHICAL FACTORS INFLUENCING SPEED OF READING

III. Length of Line[1]

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A lively interest in the effect of line length (the technical printing term is line width) upon speed of reading connected prose has been exhibited by psychologists and others working in the field of reading and in the field of advertising. Unfortunately, opinion is far from unanimous regarding optimum line length, hence conflicting recommendations are set forth in the literature. This diversity of opinion is due to the inconclusive nature of the relatively small number of studies of this important aspect of reading mechanics.

REVIEW OF PREVIOUS WORK

A. General experimental studies

The influence of length of line on ease and speed of reading was receiving attention as early as 1881. Weber,[2] working in Germany, considered that long lines favored easy and quick reading with line lengths up to, but not beyond, 150 mm. (6 inches). He recommends a minimum of 100 mm. (4 inches) and a maximum of 150 mm. (6 inches) for length of the normal

[1] This study utilized the Chapman-Cook Speed of Reading Tests, Forms A and B, published by J. B. Lippincott Co., Philadelphia, Pa. The writers are grateful to the publishers for permission to reprint these tests for experimental use.

[2] A. Weber, Ueber die Augenuntersuchungen in den höheren schulen zu Darmstadt. Referat und Memorial erstattet der grossherzoge Ministerial. Abtheilung fur Gesundheitspflege. Marz, 1881.

line. Later investigations have demonstrated that these lengths are too long to produce the most efficient reading conditions. Two years later Cohn[3] states that 100 mm. (4 inches) is the greatest line length admissible and that 90 mm. (3.6 inches) is the best length for lines of ordinary print where the letter "n" is 1.5 mm. high (10 point). With larger sized type a somewhat longer line is considered permissible. Javal,[4] in 1881, worked out the accommodation necessary in passing from the middle to the end of lines of different lengths and from this concluded that 90 mm. (3.6 inches) should be the maximum length of line employed in printed matter. Reading the longer lines would involve considerable fatigue from accommodation. Thus Javal and Cohn recognized the desirability of using relatively short lines for efficiency and ease in reading.

Huey,[5] as early as 1901 demonstrated that when lines varying in length from 21 to 121 mm. were read, more words were read per fixation with lines 60.5 mm. long, but on the whole, there appeared little correlation between line length and words read per second. However, no line lengths between 60.5 and 98 mm. were employed though smaller steps were used for both shorter and longer lines. Since there was no systematic variation of line length, and since different styles of type and presumably different sizes were used, no definite conclusions can be stated concerning optimum line length. A little later Dearborn[6] (1906) had two subjects read several typed selections, one group involving long lines (179 to 190 mm.) and the other group made up of short lines, (86 to 98 mm.). His results showed that in reading a given number of words somewhat fewer fixations were used with the longer lines. However, the average duration of the pauses was uniformly less with the shorter

[3] H. Cohn, Die Hygiene des Auges in den Schulen. Leipzig, 1883.

[4] E. Javal, L'evolution de la typographie considéréé dans ses rapports avec l'hygiène de la vue. Revue Scientifique, Troisieme Série, 1881, 1, 802–813.

[5] E. B. Huey, On the Psychology and Physiology of Reading, II. Amer. Jour. Psychol., 1901, 12, 292–313.

[6] W. F. Dearborn, The Psychology of Reading, Columbia University Contribution to Phil. and Psychol., xiv, no. 1, 1906.

lines. On the basis of these studies Dearborn suggested that line lengths from 75 to 85 mm. are probably optimal.

Blackhurst[7] (1927) determined the rate and accuracy of 1st, 2nd, 3rd, and 4th grade children in reading the material printed with lines of different lengths (55, 80, 90, 102, 120, 142 mm. for 3rd and 4th grades; 55, 80, 90, 103, 123, 142 mm. for 1st and 2nd grades). His results led him to the conclusion that the optimum line length for these four grades is 102 mm. However, the results obtained for the 91 mm. line were not significantly different from those for the 102 mm. line. Failure to state size of type used makes it somewhat difficult to interpret his findings.

B. Studies in the field of advertising

As early as 1903, Scott recognized the problem of optimum line length by posing the question, "Is a line of display type extending entirely across a page as valuable as the same display in two lines extending half across the page?"[8]

In 1913, Hollingworth stated, "The most comfortable length of line, for ordinary printing, is found to be about 3½ inches."[9] We note that specific reference to experimental work or to authority is omitted and that no mention is made regarding the size of type for which this recommended line length is optimal.

Adams, in 1916, stated, "Experiments have shown that there are two lengths of line which are practically ideal from the standpoint of rate and ease of reading. These are: the line the length of which equals the width of the newspaper column, about 2 to 2¼ inches; and the length of line of the average novel, about 3½ inches. It has been found that these lines are read with fewer stops and on the average shorter stops than lines of

[7] J. H. Blackhurst, Investigations in the Hygiene of Reading, published by Warwick & York, Baltimore, 1927, pp. 63.

[8] W. D. Scott, The Theory of Advertising, published by Small, Maynard & Co., Boston, 1903, p. 33.

[9] H. L. Hollingworth, Advertising and Selling, published by D. Appleton & Co., N. Y., 1913, p. 181.

greater or lesser length."[10] This quotation is difficult to interpret. Is one justified in concluding that line lengths intermediate between 2¼ and 3½ inches are read less efficiently? What experimental evidence exists for specifying two such definite line lengths as equally efficient and superior to other line lengths? Finally, what size of type should be used if one is to take full advantage of Adams' recommendation?

To Starch must go the credit for actually attempting to discover, through reading performance tests, the optimum length of line in advertising. The experiment was first reported in his 1914 text-book and the results are treated more fully in his 1923 text.[11] He set up three pieces of text all alike except for variation in line length and measured the length of time required to read each set-up by each of forty subjects. The results are as follows:

Length of line in inches	1½	2¼	5
Average number of words read per second	5.25	6.06	5.69

Starch interprets the above results as follows: "There is, consequently, a certain *optimum* length of line somewhere in the neighborhood of 3 inches. . . . . If we made further experiments with lines of text graded by small steps from 2½ inches to 3½ inches, we should probably find that there is very little difference within these limits." He points out that most newspaper and magazine columns fall within these optimum limits and gives reasons why an optimum line length exists.

Unfortunately, the significance of Starch's results is lessened by the fact that no mention is made regarding the size of type used in his experiment. Methodological limitations also restrict the meaningfulness of his report. We refer to the relatively small number of subjects, failure to specify the difficulty of the text or the length of the text, lack of alternate test forms, lack of checks on comprehension, absence of measures of

[10] H. F. Adams, Advertising and Its Mental Laws, published by Macmillan Co., N. Y., 1921, p. 209.

[11] D. Starch, Advertising, published by Scott, Foresman & Co., N. Y., 1914, pp. 186–187; D. Starch, Principles of Advertising, published by A. W. Shaw Co., Chicago, 1923, pp. 663–668.

variability, and failure to state the method of procedure as regards sequence in presentation of the three pieces of text to the subjects.

Snow, in his text published in 1925, quotes Starch's data on line length and points out that the difficulty experienced in reading long lines of print "depends, of course, on the size of type used."[12] However, he gives no data or suggestions regarding optimal line length for various type sizes.

Poffenberger devotes two pages of his 1925 text book to the influence of line length on the efficiency and comfort with which a line of print may be read. A long quotation from Dearborn's 1906 monograph on *The Psychology of Reading* regarding the theoretical reasons why a short line is read more rapidly than a long line constitutes the bulk of these two pages. Without citing quantitative data, this section is concluded with two illustrative set-ups printed in 8 point type, one of 81 mm. line length described as being, "too long for comfortable reading," the other of 58 mm. line length described as being "about the right length for comfortable reading."[13]

As a sample of the practical advertiser's point of view Kleppner may well be quoted to the effect that, "to make the advertisement easy to read, the lines should not be set too wide for a given size of type."[14] In a footnote he refers the reader to an appendix which gives definite recommendations regarding line length for different sizes of type. For 10 point type, the table recommends that the lines should be set within the limits of 13 and 16 picas or between 55 and 60 mm. ($2\frac{1}{6}$ to $2\frac{1}{3}$ inches). For 8 point type, such as in Poffenberger's illustrations the recommendation is 9 to 13 picas (39 to 55 mm. or $1\frac{1}{2}$ to $2\frac{1}{6}$ inches).

It is apparent from a review of experimental studies and opinions that the problem of optimal line length is in a very un-

[12] A. J. Snow, Psychology in Business Relations, published by A. W. Shaw Co., Chicago, 1925, pp. 294–295.

[13] A. T. Poffenberger, Psychology in Advertising, published by A. W. Shaw Co., Chicago, 1925, pp. 424–426.

[14] O. Kleppner, Advertising Procedure, published by Prentice-Hall, Inc. N. Y., 1927, p. 228.

satisfactory state. Experimental results have led to the recommendation of line lengths ranging from 75 to 85 mm. by Dearborn to 100 to 150 mm. by Weber. Most investigators, however, place the optimal line length at about 90 or 100 mm. In the advertising field the recommendations concerning optimal like length range all the way from 1½ inches (37 mm.) by Kleppner for 8 point type to 3½ inches (90 mm.) by Adams, Hollingworth, and Starch, without specification of type size.

EXPERIMENT ON OPTIMAL LENGTH OF LINE

In a previous paper the writers demonstrated that 10 point type yields the fastest reading and is thus the optimum size of type in comparison with 6, 8, 12, and 14 point type. These comparisons were all based on a standard line length of 80 mm. (3⅛ inches). In the present experiment, 10 point type was used throughout as the standard type size with variation in line length as the variable isolated for study. We desired to compare reading performance on the Chapman-Cook Speed of Reading Test Form A set up in lower case, 10 point Scotch Roman, 80 mm. lines of print as the *standard* and on Form B set up in lower case, 10 point Scotch Roman, but differing with respect to line length. The following seven test groups of 80 students each were used:

Group I. Form A, 80 mm., Form B, 59 mm.
Group II. Form A, 80 mm., Form B, 97 mm.
Group III. Form A, 80 mm., Form B, 114 mm.
Group IV. Form A, 80 mm., Form B, 136 mm.
Group V. Form A, 80 mm., Form B, 152 mm.
Group VI. Form A, 80 mm., Form B, 168 mm.
Group VII. Form A, 80 mm., Form B, 186 mm.

The procedure was exactly the same as that described in our article on size of type. In fact, the data on line length were obtained at the same testing periods, the type size study utilizing 320 students and the present study utilizing 560 students out of a total enrollment of about 1000 students in sophomore general psychology. The reader is referred to the previous

TABLE 1

Influence of length of line

Differences given are for the mean score on Form A, 10 point, 80 mm. line minus the mean score on Form B, 10 point, varying in line length as follows: 59, 97, 114, 136, 152, 168 or 186 mm. The mean score is the average number of paragraphs of 30 words each in the Chapman-Cook Speed of Reading Tests read in 1¾ minutes. In each sub-group, N = 80 students in sophomore general psychology.

TEST GROUP	FORM AND LINE LENGTH	MEAN	P.E.dist.	P.E.M	DIFFERENCES BETWEEN MEANS IN			P.E.Diff.	D./P.E.diff.
					Paragraphs	Words per second	Per cent		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
I	A, 80 mm.	18.31	2.74	0.31	1.25	0.36	7.3	0.23	5.52
	B, 59 mm.	17.06	2.43	0.27					
II	A, 80 mm.	18.46	2.91	0.33	0.50	0.14	2.8	0.19	2.67
	B, 97 mm.	17.96	2.54	0.28					
III	A, 80 mm.	18.19	2.92	0.33	0.96	0.27	5.6	0.17	5.55
	B, 114 mm.	17.23	2.35	0.26					
IV	A, 80 mm.	18.98	3.04	0.34	0.93	0.27	5.2	0.20	4.75
	B, 136 mm.	18.05	2.68	0.30					
V	A, 80 mm.	18.94	3.11	0.35	1.14	0.33	6.4	0.23	5.06
	B, 152 mm.	17.80	2.41	0.27					
VI	A, 80 mm.	18.88	2.35	0.26	1.47	0.42	8.4	0.16	9.07
	B, 168 mm.	17.41	2.03	0.23					
VII	A, 80 mm.	18.31	3.08	0.34	1.88	0.54	11.4	0.18	10.33
	B, 186 mm.	16.43	2.47	0.28					

article for details regarding testing procedure, time-limits, scoring, etc.[15]

[15] Paterson and Tinker, II. Influence of Size of Type on Speed of Reading. Jour. Appl. Psychol., 1929, 13, 120–130.

RESULTS

Table 1 shows that in every comparison the 80 mm. standard was read more rapidly than any other line length. In Group I, for example, the third column shows that the average number of paragraphs read was 18.31 for Form A, 80 mm. line and was 17.06 for Form B, 59 mm. line. Columns four and five give the probable errors of the distributions and the probable errors of the means for each form. In the sixth, seventh and eigth columns the differences between the averages for Forms A and B are given in terms of paragraphs read, words read per second, and per cent increase in rate of reading Form A as compared with Form B. In the ninth column will be found the probable error of the obtained differences between the means given in column 3.[16] In column 10, the ratio of the obtained difference to the probable error of the difference is shown, i.e., the value in column 6 divided by the value in column 9.

The obtained differences (in column 6) are consistently in the same direction. In every case Form B is read more slowly than Form A. The differences stated in terms of the average number of words read per second, appear to be rather small (see column 7) but when these same differences are expressed as percentages (column 8) we find differences ranging from 2.8 to 11.4 per cent none of which could be called negligible. For every comparison, except one, the ratio of the difference to the probable error of the difference (shown in column 10) indicates a very strong probability as regards the direction of the differ-

[16] The values for P. $E_{diff.}$ shown in column 9 were obtained by use of the formula for *correlated measures* i.e.,

$$P.E._{diff.} = \sqrt{P.E._{M_1}{}^2 + P.E._{M_2}{}^2 - 2rP.E._{M_1} P.E._{M_2}}$$

as given in Garrett, H. E. Statistics in Psychology and Education, published by Longmans, Green & Co., N. Y., 1926, pp. 286-288. The correlations between the paired scores in Forms A and B for the seven sub-groups in this experiment were +0.70 ±0.04 for Group I; +0.82 ±0.02 for group II; +0.85 ±0.02 for Group III; +0.82 ±0.02 for Group IV; +0.76 ±0.03 for Group V; +0.79 ±0.03 for Group VI; and +0.85 ±0.02 for Group VII.

ence to be expected in successive repetitions of the experiment under similar conditions. Even in the case of the exception (Group II), there are 96.4 chances in 100 that a difference in the same direction would be found if further experiments were undertaken. Apparently, length of line exerts as great an effect as size of type on speed of reading. For the lengths of line here investigated (59, 80, 97, 114, 136, 152, 168 and 186 mm.) and with 10 point type held constant, the 80 mm. (about $3\frac{1}{8}$ inches) length of line yields the fastest reading and, therefore, is the optimum.

DISCUSSION OF RESULTS

Since our 80 mm. line yielded faster reading than any of the other line lengths employed it is evident that the optimum for 10 point type lies somewhere between 59 and 97 mm. Table 1 shows that the 80 mm. line was read 7.3 per cent faster than the 59 mm. line whereas the 80 mm. line was read 2.8 per cent faster that the 97 mm. line. This would seem to indicate that the optimum line length lies closer to the 97 mm. end of this critical range than to the 59 mm. end. Pending further evidence we suggest that length of lines printed with 10 point type be kept within the limits of 75 to 90 mm. if conditions favoring speedy reading are desired. To discover the exact optimal point within this range further experimentation will be necessary.

Our results correspond fairly well with some of the earlier work. Javal recommended that no line longer than 90 mm. be used; Dearborn looks with favor on lines 75 to 85 mm. in length, and Starch considers the optimum line length to be somewhere in the neighborhood of 76 mm. This correspondence, of course, holds only if the earlier studies used or were concerned with 10 point type. It is to be noted that our results definitely contradict Kleppner's recommendation that 10 point type should be set up with a line width of 55 to 60 mm. We find that an 80 mm. line is actually read 7.3 per cent faster than his recommended line width.

Speed of reading depends largely on the ability of the reader

to establish and maintain regular rhythmic eye movements. Ordinarily, conditions favoring these efficient oculomotor habits depend chiefly on the length of text lines. With an optimum line length, the eye, at the first fixation of the line, gains through peripheral vision important premonitions. Succeeding fixations fill out and confirm these preliminary impressions.

Efficient use of peripheral vision during the first fixation of a line yields premonitions of coming word and phrase positions and sentence breaks. Thus future fixations are guided and also are shortened in duration. Cues from peripheral vision also aid and stimulate premonitions of meaning. These meaning premonitions often carry the reader over a word without apprehension of the word in direct fixation.

Peripheral vision is effective in the vertical direction as well as in the horizontal. Thus visual cues of words in the line succeeding the one in direct fixation are received. If such words are closely related in sense to the words fixated in clear vision meaning premonitions are facilitated.

The extent to which changes in the relative positions of words in any two succeeding lines occur when line lengths are varied may be shown by simply noting the average number of lines employed for printing the paragraphs of 30 words each in the Chapman-Cook Speed of Reading Test as used in this investigation:

Line length in mm.....	59	80	97	114	126	152	168	186
Number of lines per 30 words.....	4.3	3.1	2.5	2.2	1.9	1.7	1.5	1.3

The shift is from a 4.3 line paragraph in the 59 mm. set-up to a 1.3 line paragraph in the 186 mm. paragraph. In the former, it is evident that the beginnings of the first two lines are more closely linked in meaningfulness than in the latter. The conditions favoring premonitions of meaning are thus shown to be markedly present in the shorter lines and less so in the longer ones.

Furthermore, where the lines are comparatively long the eye must proceed more carefully, devoting greater attention to each fixation because peripheral vision accompanying the first fixa-

tion in a line is less effective here than with shorter lines. With long lines the return sweep from the end of one line to the beginning of the next is usually inaccurate, causing the reader sometimes to re-read the same line or to omit a line or in any event to re-fixate the beginning of the right line. In addition, long lines involve greater fatigue from accomodation adjustments as demonstrated by Javal. These difficulties slow up reading.

Less efficient reading with very short lines is probably due to inability to establish rhythmical eye movements. Perhaps, lines shorter than the optimum preclude maximum utilization of peripheral vision horizontally at the same time increasing the number of relatively long fixational pauses which occur at the beginning of each line for a given amount of text material. At any rate our findings are in harmony with those of Huey who showed that text with lines varying from 21 to 43 mm. in length was read slower than text with a line length of 60.5 mm.[17]

The above analyses and interpretations were confined solely to the effect of line length on the *average* speed of reading of college sophomores. An important question may be raised, namely, does such a typographical factor as line length operate upon *fast* readers and *slow* readers in the same way and to the same extent as upon *average* readers? This question may be answered by a comparison of the relative performances of fast and slow readers when reading text set up in the optimum line length and when reading any other line length, due regard having been made for regression.

Analysis of the scatter diagram plotted in obtaining the correlation of +0.76 between Form A and Form B (both forms printed in 10 point type with 80 mm. line lengths) as given to 2260 Twin City high school seniors shows clearly that the increased difficulty of Form B just off-sets whatever practice effects may be present for the *average* reader only.[18] However, fast readers make a lower score and slow readers make a higher score on

[17] E. B. Huey, op. cit.

[18] Paterson and Tinker, op. cit.

Form B than on Form A. As pointed out by Kelley such a phenomenon is due to the principle of regression which is mathematically inevitable for all measurements having reliability coefficients less than unity.[19]

Analysis of a similar scatter diagram for our experimental group showing the paired scores on Form A and Form B, in which Form B always differs from Form A in line length as previously described, reveals a similar retardation in speed of reading for fast readers and a marked improvement in speed of reading for slow readers. Interpretation of this scatter diagram, *by itself*, would lead to the conclusion that change in line length from the optimum profoundly affects the fast readers and has less and less effect as we pass down the scale to a point where the change in line length from the optimum actually seems to be beneficial for the slow readers. This conclusion would be wholly unjustified, however, because the differences for the various degrees of reading ability involved must be interpreted in terms of the general trend to be expected when Form B is identical with Form A in typographical arrangement. Data permitting accurate interpretation of the effect of change in line length on fast, mediocre, and slow readers are presented in Table 2.

Table 2 is to be read as follows taking for example the first row of figures: (*a*) 161 high school seniors (column 2) who scored either 29 or 30 points on Form A (column 1) obtained an average score of 27.33 on Form B (column 3), the difference between the mean for Form A and the mean for Form B was, therefore, 2.67 paragraphs (column 4). This means that, for fast readers, Form B, on the average, is read 2.67 paragraphs more slowly than Form A during a given time interval. (*b*) 8 college sophomores (column 5) who scored either 29 or 30 points on Form A (column 1) obtained an average score of only 25.5 on Form B (column 6), the difference between the mean for Form A and the mean for Form B was, therefore, 4.50 para-

[19] T. L. Kelley, Interpretation of Educational Measurements, published by World Book Co., Yonkers, N. Y., 1927, pp. 176–181.

graphs (column 7). This means that, for fast readers, Form B, when it differs systematically from Form A in length of line, is read, on the average, 4.50 paragraphs more slowly than Form

TABLE 2

Analysis of effect of change in line length upon fast, mediocre, and slow readers

Comparison of mean scores in Form B made by subjects who obtained various specified scores in Form A for high school seniors when Forms A and B were typographically identical and for college sophomores when Form B differed from Form A by systematic changes in line length. These comparisons afford a basis for determining the *relative* effects of changes in line length upon the fast, mediocre and slow readers. See text for further description and interpretation.

MEAN SCORE, FORM A	2260 HIGH SCHOOL SENIORS			560 COLLEGE SOPHOMORES			NET EFFECT OF CHANGES IN LENGTH OF LINE
	Number of cases	Mean score, Form B	Mean of Form A minus mean of Form B	Number of cases	Mean score, Form B	Mean of Form A minus mean of Form B	Values in column 7 minus values in column 4
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
30.0	161	27.33	2.67	8	25.50	4.50	1.83
28.0	115	25.39	2.61	18	23.67	4.33	1.52
26.0	150	24.41	1.59	37	22.43	3.57	1.98
24.0	224	23.07	0.93	42	21.62	2.38	1.45
22.0	275	21.44	0.56	67	20.33	1.67	1.11
20.0	326	19.82	0.18	102	18.49	1.51	1.33
18.0	330	18.38	−0.38	82	16.68	1.32	1.70
16.0	275	16.88	−0.88	115	15.65	0.35	1.23
14.0	191	15.91	−1.91	59	15.05	−1.05	0.86
12.0	127	14.36	−2.36	16	13.25	−1.25	1.11
10.0	43	12.98	−2.98	13	12.31	−2.31	0.67
8.0	17	12.71	−4.71	0			
6.0	11	14.36	−8.36	1	8.00	−2.00	6.36
4.0	6	14.00	−10.00	0			
2.0	9	6.22	−4.22	0			

A during a given time interval. (*c*) The net effect of changes in length of line, therefore, is found by subtracting the differences for college sophomores (column 7) from the difference

for high school seniors (column 4) yielding for those scoring 29 or 30 on Form A a net effect of 1.83 paragraphs (in column 8). This is our crucial comparison permitting us to say that for fast readers Form B when set up in non-optimal line lengths is read 1.83 paragraphs more slowly than Form A.

By reading down column 7 it would seem that fast readers are greatly handicapped, mediocre readers are handicapped only slightly, and slow readers are actually benefited by the introduction of non-optimal line lengths in the printing of Form B. This impression, however, is counteracted by reference to column 4 which shows a similar shift in the relative speeds of reading Form B as we pass from the performance in Form A of fast readers, mediocre readers, and slow readers. The values in column 8 show that changes of line length from this optimum of 80 mm. for 10 point type tend to slow down the rate of reading on all levels of reading ability here investigated.[20]

A minor variation in the column 8 values does exist however, which is readily revealed by lumping contiguous values in a rough sort of smoothing process. If we divide the readers into three groups on the basis of performance in Form A we get the following averages: (*a*) for those scoring 23 or more points in Form A the average value is 1.69; (*b*) for those scoring between 17 and 22 points, inclusive, in Form A the average value is 1.38; (*c*) for those scoring between 9 and 16 points inclusive, in Form A the average value is 0.97. This method of analysis indicates, then, that non-optimal line lengths exert relatively greater influence in retarding fast readers than in retarding mediocre or slow readers. One must not overlook the fact, however, that non-optimal line lengths retard slow readers to an appreciable extent.

SUMMARY AND CONCLUSIONS

1. A review of previous work and opinion on the influence of line length on speed of reading shows that for the most part

[20] The same analysis of the data previously reported on size of type yields approximately the same results. Typographical factors which retard average readers operate likewise on fast and slow readers.

short lines are favored over long ones. Results and recommendations even when specific, are difficult to interpret because generally there has been failure to specify size of type used.

2. A speed of reading record was obtained for texts set up with lines 59, 80, 97, 114, 136, 152, 168, and 186 mm. in length with size of type kept constant at 10 point. Comparisons were made between the 80 mm. line and each of the other lengths of line. There were 560 college students used in the experiment.

3. The texts in 59, 97, 114, 136, 152, 168, and 186 mm. were read more slowly than the text in 80 mm. The differences ranged from 2.8 to 11.4 per cent and all but one (80 mm. vs. 97 mm.) were statistically significant, and even in this exceptional case there are 96.4 chances in 100 that a difference in the same direction would be found if the experiment were repeated under similar conditions. All but one difference was greater than 5 per cent and consequently of practical significance in the hygiene of reading.

4. The results obtained in this experiment justify the conclusion that, for 10 point type and for the comparisons here made, an 80 mm. line yields the fastest reading and is therefore the optimum length of line for efficient reading. Pending further experimental work we suggest that material printed with 10 point type be kept within the limits of 75 to 90 mm. if fast reading be desired.

5. Further analysis of these data show that the 80 mm. optimum holds for fast and slow readers as well as for average readers among college students although there is evidence that fast readers are retarded relatively more than are average or slow readers.

SPEECH AND SPEECH-READING TESTS FOR THE DEAF[1]

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In a recent survey[2] of schools for the deaf tests of speech, speech-reading, intelligence and educational achievement were given. The original report contained no discussion of the relationship between the speech and speech-reading tests and the other tests. It seemed of interest to study this relationship.

The tests of speech and speech-reading prepared by Day and Fusfeld are the first attempt at objective measurement of these abilities among the deaf. For the speech-reading tests four similar sets of ten sentences each were constructed. These sets of sentences were read to the pupils, who were instructed to write down exactly what they could read from the lips. One set was read by the teacher and another similar set by the field agent conducting the survey.

For the tests for intelligibility of speech eight similar sets of ten sentences were constructed. A set was chosen at random and given to a child, who then read the sentences aloud and the examiner wrote down what he thought the child said. A similar set was read by the child to the teacher.

We have, therefore, two measures of speech-reading and two measures of intelligibility of speech for each pupil examined. This allows a comparison between the tests given by a teacher

[1] This work has been done under the auspices of the Division of Educational Relations of the National Research Council, to which the author is indebted for aid in carrying out this study.

[2] Day, H. E., Fusfeld, I. S., and Pintner, R., A Survey of American Schools for the Deaf. National Research Council, Washington, D. C., 1928.

familiar with the pupils, and the tests given by an outside examiner. The correlation between the teacher's and examiner's scores for each child will show the agreement between such tests, and the coefficient of correlation resulting may be looked upon as a kind of reliability coefficient for this type of testing.

For four hundred cases we have the following information for the two tests:

	r	P.E.	MEAN TEACHER	MEAN EXAMINER	S.D. TEACHER	S.D. EXAMINER
Speech	.86	.008	60.3	49.3	33.4	35.3
Speech-reading	.84	.01	51.7	40.0	29.7	27.1

It will be noted that in both tests the mean scores given by the teacher are much higher than those given by the examiner. The children are able to interpret the teacher's lips better than those of the examiner, and the teacher is much better able than the examiner to understand the speech of the pupils. It is obvious, therefore, that the results of these tests for different pupils or schools cannot be compared with each other if the tests are sometimes given by the teacher and at other times by an outside examiner. In all probability usable results for the comparison of schools could only be obtained by the application of the tests by the same individual throughout. The relatively high correlations for both tests would seem to indicate a fair degree of reliability for tests of this type. These coefficients would undoubtedly be higher if we had two testings of each child by both the examiner and the teacher. If we regard the coefficients obtained as reliability coefficients, they compare very favorably with reliability coefficients for short group intelligence tests. We may consider the measures of speech and speech-reading, therefore, as fairly reliable measures of these functions.

What is the relationship between speech and speech-reading

as tested by these tests and intelligence as tested by the Pintner-Non-Language Test? The correlations for various groups of children are given below.

I. Speech, as tested by the outside examiner, and the Pintner Non-Language score

	r	P.E.	MEAN SPEECH	MEAN N-L	S.D. SPEECH	S.D. N-L
a	+.03	.05	59	416	30.6	87.8
b	−.15	.05	76	398	27.4	81.2
c	+.005	.03	58	406	33.4	86.7

a refers to 212 cases in institutions for the deaf; *b* refers to 196 cases in day schools for the deaf; *c* refers to 383 cases in both day schools and institutions.

II. Speech, as tested by the teacher, and the Pintner Non-Language score

	r	P.E.	MEAN SPEECH	MEAN N-L	S.D. SPEECH	S.D. N-L	N
Institutions.....	+.16	.04	60	415	32.4	85.4	212
Day schools.....	−.14	.04	80	397	25.7	81.5	196

All these correlations between speech, whether rated by the examiner or the teacher, and our measure of non-verbal intelligence are zero. This does not mean that there is no relationship betwen speech and intelligence in general, for we are dealing here with a very selected group of pupils. The speech tests were given only to the three most advanced classes in any school. We can see that they are a selected group from the point of intelligence by noting that the mean score in the Pintner Non-Language is about 400 points. This mean is much higher than the means for ages 12, 13, 14, and 15 as reported in the survey, these means being 258, 276, 301, and 320 respectively. This mean of 400 is also higher than the mean score for 14- or 15-year-old hearing children. Within this select group of advanced students there is no correlation between intelligence and intelligibility of speech.

Let us now turn to the correlations between speech-reading and intelligence:

I. Speech-reading, as tested by the outside examiner and Pintner Non-Language score

	r	P.E.	MEAN SPEECH-READING	MEAN N-L	S.D. SPEECH-READING	S.D. N-L	N
Institutions.....	+.02	.05	42	416	21.5	86.7	212
Day schools.....	+.13	.05	53	397	28.3	85.7	196

II. Speech-reading, as tested by the teacher, and Pintner Non-Language score

	r	P.E.	MEAN SPEECH-READING	MEAN N-L	S.D. SPEECH-READING	S.D. N-L	N
Institutions.....	+.13	.05	50	416	27.1	86.7	212
Day schools.....	+.13	.05	66	400	39.5	79.7	196

Here again we find zero correlations between speech-reading and intelligence. Among the selected group who were chosen to take these speech and speech-reading tests there is no correlation between their ability in these functions and their intelligence as measured by a coarse measure of intelligence, such as the Pintner Non-Language Test. To reach the highest grades in most deaf schools implies a certain ability in speech and speech-reading. Such children have on the average a fairly high intelligence rating. To obtain the correlation between intelligence and speech or speech-reading for deaf children in general, we should require a much finer measure of these latter functions and we should have to measure the total range of ability from the beginners up to the most advanced pupils.

Incidentally, we may note that the day-school pupils show a markedly higher average for speech and speech-reading than the institution pupils, while their intelligence rating is slightly below that of the institution pupils.

What is the relationship between speech and speech-reading and educational achievement, as tested by the Pintner-Educational Survey Test? Below are the correlations for these variables:

	r	P.E.	MEAN SPEECH	MEAN E.A.	S.D SPEECH	S.D. E.A.	N
Speech (examiner):							
Institutions	+.33	.04	59	49	27.7	17.7	212
Day schools	+.47	.04	77	49	27.6	22.1	187
Speech (teacher):							
Institutions	+.46	.04	60	49	32.6	17.7	212
Day schools	+.51	.04	79	49	25.7	21.5	195
Speech-reading (examiner):							
Institutions	+.32	.04	42	49	24.6	17.7	212
Day schools	+.61	.03	53	48	28.4	22.5	198
Speech-reading (teacher):							
Institutions	+.37	.04	50	49	27.1	17.7	212
Day schools	+.65	.03	65	48	30.2	22.5	198

The correlations for both groups on both tests are positive and marked. Between speech and speech-reading and educational achievement there is obviously something in common. The relationship is strong enough even to show itself in this highly selected group of deaf children. Language, knowledge of words, of word forms and of sentence structure are necessary for speech, for speech-reading, for reading and answering the questions on the educational test. All these things are closely interrelated in the education of the deaf child. The correlations seem to be somewhat higher in the day schools than in the institutions, probably because the day schools include more children with more hearing and also more cases of late onset of deafness.

These two factors, amount of hearing and age of onset of deafness, are undoubtedly of some importance in connection with speech and speech-reading. For our selected group we have the following correlations:

I. Speech and maximum audiometer rating

	r	P.E.	MEAN SPEECH	MEAN AUDIOMETER	S.D. SPEECH	S.D. AUDIOMETER	N
Examiner	+.26	.02	59	26	30.5	15.8	214
Teacher	+.17	.04	59	26	33.5	15.8	214

II. Speech and age of onset of deafness

	r	P.E.	MEAN SPEECH	MEAN AGE	S.D. SPEECH	S.D. AGE	N
Examiner	+.34	.04	59	2.2	30.5	2.6	210
Teacher	+.30	.04	59	2.2	33.5	2.6	210

In both cases the correlations are slightly positive. These are correlations for institution children only. They would probably be somewhat higher for day-school children. Such as they are, however, they indicate that intelligibility of speech goes along with amount of hearing and age of onset of deafness, even when speech has been measured by a very coarse instrument.

The implications of this article seem to point to the possibility of the construction of speech and speech-reading tests of the type experimented with in the survey. It would seem that such tests if lengthened and used by trained examiners might approach a satisfactory degree of reliability and validity. With such tests a wider range of speech and speech-reading could be tested. As for our present results, they would seem to indicate that after a certain level of intelligence has been reached, intelligence of the non-verbal type is not a factor in speech and speech-reading. Educational attainment is, however, somewhat connected with speech and speech-reading, each one of these factors undoubtedly having influence upon the others. There are also indications that amount of hearing and age of onset of deafness are of importance for the intelligibility of speech. With better measures of all these variables, the real relationship existing between them could be pushed further.

AN OBJECTIVE MEASURE OF EMOTIONAL INSTABILITY

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INTRODUCTION

In an attempt to make a study of kinaesthetic motor learning among a group of juvenile delinquents through the use of a high relief finger maze, the surprising observation was made that there were certain definite characteristics in the learning curve peculiar to those boys of unstable emotional make-up which definitely differentiated them from the others.

It is with this difference, based upon characteristics of the learning curve of individuals learning to "run" a high relief finger maze, that this article primarily concerns itself.

DESCRIPTION OF APPARATUS

The maze used is patterned after one used in the Psychological Laboratory of the University of California, the pattern of which was designed by Pechstein (21, 22) as a stylus maze, but given the high relief form by Professor Warner Brown of the University of California. A picture of the maze used in this experiment is shown in figure 1.

The maze itself measures 9 inches square and is appliquéd upon a wooden panel 12 inches square and ½ inch thick. The strips which make up the paths of the maze are made of narrow pieces of soft pine wood 9 mm. wide and 6 mm. high and varying in length, the strips being nailed to the panel with small brads counter-sunk and puttied. The upper surface of the path, blind alleys and culs-de-sac are smoothed down with fine sandpaper so as to be as non-irritating as possible to the finger of

the subject. The joinings of the strips act as slight obstructions or deflections and make the learning of the maze more difficult.

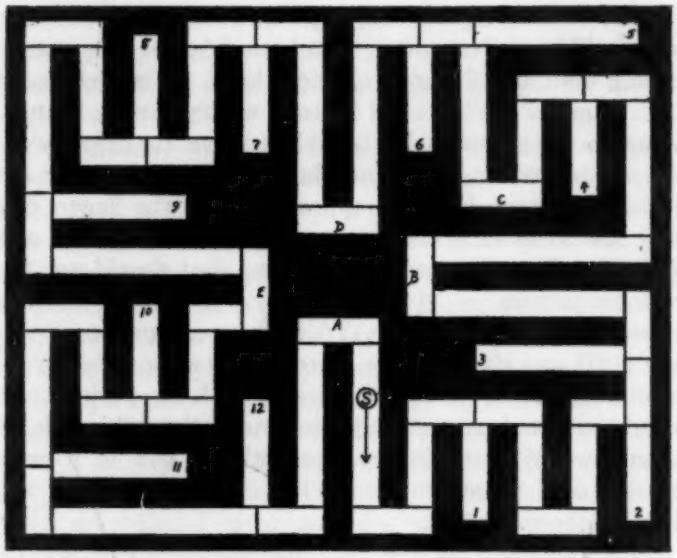

FIG. 1. THE MAZE PATTERN

The above picture is an exact pattern of the maze used in this experiment. The numbered sections are all blinds or culs-de-sac. The lettered parts are the more important turns in the true path of the maze. Refer to table 2 for the percentage of errors made on each individual blind or turn. The point at *S* is the starting point from which the subject must trace his way around the maze and back again to *S*.

PROCEDURE AND METHOD

The technique employed in instructing the subject about the maze is very simple and follows closely but with modifications the standard blindfold technique developed and used by Professor Walter Miles (1) of Stanford University although worked out independently by the writer.

Briefly, the subject sits opposite the examiner at a small

table. A comfortable blindfold[1] is applied and the subject instructed as to the nature of blinds, goal position, retracing, etc. The maze is then produced and laid upon the table directly in front of the subject. He is given no clue as to its size or shape. The experimenter introduces him to the maze by placing the index finger of his right hand (if left handed, the index finger of the left hand is used) on the starting button, as shown in the picture. He is told to move his finger towards him and to find his way about the maze until he again reaches that same button from the opposite side. The fingers of the subject's left hand should rest easily upon the lower left corner of the panel as a matter of orientation, but should not touch the maze pattern.

No "sample" trial (Miles (1)) or "manual guidance" (Ludgate (12)) was given in this procedure as such a "sample" or "manual guidance" is apt to interfere with the purpose of the experiment, and any attempt to orient the subject in this manner would naturally tend to stabilize him to a certain degree. Any procedure directed toward this end is to be avoided where possible.

The individual is required to "run" the maze over and over again until two successive trials result in no errors. The initial learning is practically a trial and error method in all cases. Peterson (15) has made a study of the limits of this type of learning but by use of another device.

An accurate check of the number of errors made for each trial is kept as well as the time required to complete each trial. Besides this, the course pursued is carefully noted and recorded if possible. This latter can be recorded by another observer, but the writer has worked out a technique which will allow one examiner to handle the complete procedure simultaneously.

Adequate rest periods are given if the time required becomes too long and the trials necessary to learn the maze too many, or if the individual shows signs of becoming tired or discouraged.

[1] The blindfold used by Professor Miles (1) at Stanford University is strongly recommended, although it was not used in this experiment.

The length of time of the rest periods may vary from five minutes to one hour or more. It is preferable for this type of experiment not to prolong the rest periods.

No attempt will be made in this article to go into the methods of learning employed by the subjects while learning the maze as this phase of the subject has been quite adequately covered by others (2, 3, 4, 5).

The methods of study in this experiment as well as all deductions based upon the collected material are all objective in character. The individual was not questioned as to his procedure during the learning process, nor was he asked any questions after the learning was completed. All subjective and introspective material is discarded, as the subjects selected for experimentation were not good psychological material for anything other than a purely objective study.

It must be understood that practically all previous studies of this nature (kinaesthetic motor learning), especially those of Miles (1), Husband (2), Perrin (4), Snoddy (6, 7), and Warden (10) have been performed by college trained subjects in the field of experimental psychology who were thoroughly capable of making introspective analyses of their learning processes.

METHOD OF SELECTION

The subjects used in this experiment were boys committed to the Jesse W. Lilienthal School by the Juvenile Courts of San Francisco and nearby counties. The majority of these boys have had more than one court appearance, some as many as five or six appearances.

Twenty boys were selected from a group of over one hundred purely on a basis of emotional stability. Such attributes as intelligence, school progress, initiative, etc., were entirely disregarded. Ten of these boys were selected on a basis of maladjustment to the group. All of them exhibited from a mild to a marked degree personality traits generally designated as psychopathic. These selections were made on the basis of their general behavior at play and in the class room as well as at work. They were also selected from the group because

they showed signs of variability beyond the limits generally designated as "usual" on various tests and scales, and all more or less suffered under the criteria set by Mateer (8) for the determination of psychopathy.

The other ten boys were selected on just the opposite basis. These were boys of fairly stable make-up; i.e., as stable as can generally be found in a group of Juvenile Court wards. These boys showed practically no behavior disorders in relation to the group in which they were adjusted. They came in contact with the law for the commitment of overt acts against society, but the probable causal factors involved were either of environmental origin, such as poor and broken homes and dependency, or general hereditary weaknesses of the will and volitional centers. However, this group would probably not come up to the standards of normality set by a group as carefully selected from a public school situated in the "better" part of town, but for purposes of comparison, the differences exhibited between this selected "normal" group and this selected "psychopathic" group are great enough to show consistent variance from each other to such a degree as to be considered significant as well as diagnostic.

REACTIONS

From a psychological point of view, the maze idea is important in this connection in so far as the development of motor habits play "an increasingly important rôle during succeeding trials." "The ability to run a maze with a decreasing number of errors, develops with the ability to image the path."

In engaging in the active task of exploring the maze, the subject is "the recipient of a definite sequence of kinaesthetic sensations, due to arm movement and strain, and definite cutaneous sensations" brought about by pressure of the index finger "nosing" its way along the path of the maze (Perrin (4)).

The subject set himself to the task of discriminating true paths from the false, but if the same false path had been taken several times in succession, it was very difficult in most cases for the individual to change that pattern which had become

more or less temporarily fixed. However, the utilizing of past false experiences and the organizing of knowledge gained from each trial in such a way that it could be adequately applied to the succeeding trial, was the general method of attack by the selected "normal" group.

The utilization of and the profiting by false moves was not objectively visible in the selected "unstable" or psychopathic group. Their moves were more scattered and more widely divergent. After having a fairly clear image of the maze in mind after successive trials, one false move oftentimes would cause the subject to "blow up" and a complete inability to recover his composure ensued. The result, as would be expected, was disastrous in so far as obtaining a smooth learning curve was concerned, but highly diagnostic of an emotional upset over which the subject had no control. If repeated experiences of this kind showed the same type of reaction when difficulties or obstacles had to be overcome, that particular individual might be considered as "emotionally unstable." Inability to act in an emergency, keep cool, retain his poise and composure, all showed up definitely under the mild strain of learning the finger maze.

On the other hand, the selected "normal" group showed no symptoms of erratic behavior while learning the maze, except occasionally of course when the subject became too tired and trials were given too rapidly in succession without sufficient rest periods. The curve then became somewhat irregular but never to the extent found in the other group.

As regards emotions, Perrin (4) states:

> The process of learning the maze elicited at times affective reactions that in some cases obviously influenced the progress of the subject. There were sufficiently in evidence, as one would assume, the feeling of discouragement in times of difficulty and the corresponding stage of elation when the difficulty was overcome.
>
> The extremely disagreeable, hopeless feeling of being baffled very often resulted in a definite change of activity or method. Repeatedly the subjects would find themselves in culs-de-sac, would try at some length to extricate themselves by a study and exploration of the region, and would then resort in disgust to a random trial and error procedure in an effort to escape at any cost.

This behavior as described by Perrin for his pencil or stylus maze, was essentially the same as observed on the finger maze, except that my subjects showed more signs of discouragement when culs-de-sac were entered at about the time when fatigue was beginning to become apparent. This, however, was a purely relative matter according to the stability of the individual subject. Greater divergences, more discouragement, more baffling experiences, were evidenced by those classified in the "unstable" group. In two instances this behavior showed itself in the other group of subjects, but upon inquiry it was learned that these individuals had experienced emotional upsets of a personal nature just prior to their learning to run the maze.

It was also observed that the maze was more quickly learned by an individual of the "normal" group who passed through it with a minimum number of errors during the first few trials. This built up a feeling of confidence and "satisfyingness" (Snoddy (6)) and had a stabilizing effect which aided greatly in the learning of the maze. This confidence was soon dispersed among those of the "unstable" group, for their attentivity and confidence as well as satisfaction induced by a nearly successful performance, were soon broken down when slight failures chanced to enter into their learning. Elation over small successes and discouragement over slight failures is a characteristic practically always found among these psychopathic children.

Other reactions noted during the "running" of psychopaths on the finger maze were a quickened pulse and respiration, the latter becoming heavier and more labored. The amount of motor activity was also increased, and as a result the subject made more errors. A very good example of this is shown in the graph of case R. B., figure 5. The seventeenth trial shows 25 errors made on account of just this thing. In many cases perspiration stood out on the skin of these individuals at the time when they became emotionally disturbed. These disturbances caused the index finger (the tracing finger) to move with much carelessness and more rapidity and to show signs of nervousness and restlessness, showing that the individual was in a very upset and tense condition. At the end of the experiment

the subjects of this group were usually tired out while their more calm brothers of the other group were willing to go ahead and try more.

CRITICISM

The type of maze used in this experiment has been criticised by some as not being adequate for the problem under investigation due to irregularities in its construction and design, etc. It has also been stated by one observer that the width of the strips used for the paths of the maze is too great to allow the subject to experience all of the leads. This fact was recognized as there was a tendency for some individuals to follow along either the inner or outer border of the paths at times. This difficulty was overcome to some extent by reminding the subject to keep his finger squarely on top of the path whenever he showed a tendency to go to either side. Thus, if the subject followed the inside of the path from *S* (the starting point) in figure 1, he would probably miss blind No. 1 entirely and run into blind No. 3. If he took the outside from *S*, he would undoubtedly strike blind No. 1 and also No. 2. However, it is the writer's contention that this possibility is of little moment as the chances for taking the same blinds are even between the two groups of individuals studied. In fact it is the belief of the writer that such a type of maze for this particular purpose is superior in some respects to those constructed out of wire, shot, string, etc., by other maze enthusiasts which allow the finger to experience all leads at every trial. The reasons for this belief are that a normal stable individual is not particularly upset should he happen upon a blind he had not experienced in previous trials. On the other hand, an unstable individual is so often upset over this experience that the following trials consist of a series of errors not made before. It is easy to see the advantage of this type of construction in differentiating the two groups, i.e., the stable from the unstable.

One observer happened to mention that should an individual experience a lead he had not experienced before due to this type of construction, it would cause him to become confused

and "blow up." He was apparently not aware of the fact that that was just what we wanted our psychopath to do, for experience has shown that it is only the emotionally unstable individual who becomes confused and "blows up."

Nevertheless, we do not contend that this apparatus is entirely foolproof or 100 per cent diagnostic for emotionally unstable individuals, but experience with it does prove sufficiently to us that it does and will adequately differentiate between clear cut emotionally stable and emotionally unstable personalities. After all this is the only thing sought in this experiment. We are not concerned with the laws of learning (Haggerty (17)) or with proper and specific types of learning curves, nor are we concerned with any introspective analyses of the types of learning used or methods of selection. Others in the field, especially Warden (10), Wilson (11) and Gould and Perrin (16) have gone into this quite thoroughly. We are only after the final results, an objective picture of an individual's performance on this type of maze.

It is planned that very shortly work will begin on other types of mazes especially that type described by Miles (1) (a modification in relief of the Warden stylus maze) in an effort to determine qualitative differences, if there are any, between similar groups of individuals carefully selected for this purpose. If similar results are obtained with other more simplified mazes and mazes easier to construct than the one described in this article, then this type of maze will be discarded for another more desirable one. But until such type of maze is developed it is safe to say that the one used here is sufficient for our purposes and can be properly used to differentiate the more clear cut cases with a fair degree of accuracy. The maze is long enough and difficult enough to cause any type of person a little consternation. The possible errors are many, more than are shown by the numbers on the plate. The chances for reversing one's direction are also great, although to shorten the time of the individual test the subject is told when he is reversing his direction and this is counted as one error unless he persists in going back again.

RESULTS

1. Relation to intelligence

All individuals except one in this group had been given thorough psychological examinations. The Stanford Revision of the Binet-Simon Scale was used in every case either by the writer or by a thoroughly competent and reliable tester. In many cases performance scales and educational tests were given. Eight of the twenty boys were Research Cases referred to the Research Department by the Juvenile Court as personality deviates. These cases consequently received more comprehensive study and observation and by being included in this experiment a more accurate diagnosis of their stability was available.

The IQ's of the psychopathic group range from 75 to 123 with an average of 93 (see table 1). The IQ's of the "normal" group range from 68 to 122, with an average of 99.8. These intelligence scores were correlated with performance on the finger maze and relationship showed a correlation of approximately zero. Thus, the boys with low grade intelligence were able to learn the maze with as much rapidity and oftentimes better than those of higher intelligence. We can see from this that intelligence plays a very small part, if any, in the solution of the maze. It is the effectiveness of the intelligence that counts. This fact has been discovered by other investigators as well (Snoddy (7) and Gopalaswami (9)). This zero correlation between intelligence and maze learning is of value because it practically shuts out this variable so often encountered in tests of emotional reactions.

2. Relation to age

Among both groups of boys as well as in other examinations made upon children and adults not included in this study there is shown some relationship to the chronological age of the individual. It is found that very young individuals take considerably longer time to learn the maze than do older individuals regardless of intelligence or stability. This can prob-

TABLE 1

A statistical compilation of the results of the two groups under investigation which shows numerically the rather wide range of difference between the stable group and the unstable group

NORMAL GROUP							PSYCHOPATHIC GROUP						
Case	C. A.*	Trials	Time†	Errors	S.D.‡	IQ	Case	C. A.	Trials	Time	Errors	S.D.	IQ
E. K.....	16–6	28	1735	115	4.05	100	D. A.....	16–4	4	1047	31	7.75	96
M. J.....	16–2	18	2584	55	2.74	56	A. G.....	13–8	23	2028	91	2.01	94
W. S.....	14–5	14	1745	55	4.00	122	C. W.....	13–0	15	2220	49	2.02	123
K. J.....	13–4	6	792	21	4.40	116	E. O.....	17–5	34	4923	109	3.84	92
J. M.....	13–8	15	1832	34	1.73	68	P. B.....	17–0	19	2555	86	3.63	104
R. S.....	14–1	8	927	19	2.50	100	E. K.'...	14–11	33	2604	128	4.00	84
F. M.....	17–4	18	2584	61	1.94		R. B.....	10–9	43	5935	242	6.17	101
H. D.....	16–0	24	3883	55	1.77	114	J. P.....	10–4	29	3529	109	2.16	86
H. S.....	13–11	14	1542	37	2.84	119	E. S.....	16–1	20	2153	87	3.88	75
H. R.....	15–11	19	1629	66	3.24	104	E. D.....	16–4	27	3091	191	6.50	75
Totals.....		164	19253	518					247	30085	1123		
Averages..	15–1	16.4	32.08′	51.8	2.92	99.8		14–6	24.7	50′	112.3	4.19	93

* Chronological Age recorded in years and months.

† Time is here recorded in seconds, the averages being computed in minutes.

‡ Standard Deviation.

ably be accounted for due to the fact that the maze presents a problem of meeting difficulties and overcoming them by utilization of past experiences. If it is the utilization of past experience that helps to overcome these difficulties, then it is natural to expect that boys of older age would naturally profit more by this than the younger boys because they have had more experience with just this thing. Gould and Perrin (16) account for the superiority of adult performance over that of children as being due to "more effective intelligence and more motor stability" in adults.

3. The learning curve

The learning curves shown in this article are peculiar to the maze used in this experiment and probably would not have the same characteristics for other types of mazes inasmuch as the type of learning curve is determined to some extent by the pattern of the maze itself (Gould and Perrin (16)).

When the number of errors per trial are plotted on a graph for each individual case, a remarkable distinction occurs between the two groups studied. Of course there is no sharp line of demarcation between one group and the other as there is some overlapping, but collective results of both groups show considerable difference. See table 1 for data. Snoddy (7) partly explains this phenomenon by stating that low stabilities, which are associated with emotional states, are the result of a "low basic capacity to endure stimulation."

The most graphic differences are shown in the plotting of the learning curves of the two groups. There are only three traits which both groups have in common, namely, a large number of errors at the initial trial, a rapid descent from the first to the third, fourth or fifth trials (Hicks and Carr (5)), and in most cases a gentle or abrupt rise before beginning the gradual descent when the curve finally reaches the zero level.

The main difference between the learning curve of the "normal"[2] boy and the psychopathic or unstable boy is that

[2] The term "normal" used from now on designates those individuals of stable emotional make-up regardless of intelligence. If a boy with an

the latter invariably shows a most irregular curve with many steeples which tend to spread a great distance from the central tendency and the "relative rate of elimination" of errors is decreased to a minimum. This is in contrast to the more or less smooth "gradual slope" (to borrow a term from Thorndike) of the normal boy which oftentimes shows plateaus of learning hardly ever found among the unstable group.

4. Analysis of errors

An exhaustive study of the errors made or of the reliability of the high relief finger maze was not made, as a technique enabling one observer to keep an accurate check on the number of errors per trial and to record the time utilized to complete each trial, together with the actual course with errors made, had not been worked out until the experiment had nearly been completed.

However, five complete courses were kept in detail and an analysis of these will give a fairly accurate idea as to the percentage of errors made for each retracing, numbered blind and lettered turn as shown in the picture of the maze. The five individuals whose complete records were kept include two psychopaths and three normals; two of the latter being adults, one 22 years of age, the other 30 years of age. In the opinion of the writer these 5 cases are typical of the groups as a whole as observations made on all cases show that the percentage of errors made for each blind, turn, retracing, etc., is about the same as shown for the small group where accurate record was kept.

A glance at table 2 will show quite clearly that the majority of errors are included among the retracing, this being 23.5 per cent of the total number of errors. Next in number is blind No. 12, this being 10.7 per cent of the total number. As this blind is the last one before the final upward move is made it is very easy for one to mistake this for the path leading to *A*. Next in order of the greatest number of errors is blind No. 10,

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IQ of 68 shows a smooth and gradually descending learning curve, he is considered "normal" from an emotional point of view.

TABLE 2

Analysis of errors

This table shows quite clearly the percentage of errors made for each numbered blind, cul-de-sac or lettered turn (see picture of maze, figure 1) by five individuals. The number, though small, is characteristic of the entire group.

CASE	NUMBER OF ERRORS																	
	Blinds and turns																	
	1	2	3	4	5	6	7	8	9	10	11	12	R*	A	B	C	D	E
G. G.	8	6	4	0	1	7	8	13	0	9	2	12	28	2	2	1	1	11
E. D.	16	9	7	6	3	10	8	12	0	22	7	17	62	0	1	0	1	8
H. R.	6	4	0	1	2	5	5	9	2	2	11	11	6	0	0	0	1	1
C. B.	2	2	6	2	0	1	2	5	0	5	1	5	5	0	2	0	0	2
M. B.	2	0	0	0	0	1	1	3	0	1	1	1	0	0	0	0	0	0
Totals	34	21	17	9	6	24	24	42	2	39	22	46	101	2	5	1	3	22
Percentage	7.9	4.9	3.9	2.1	1.4	5.6	5.6	9.8	0.5	9.1	5.1	10.7	23.5	0.5	1.0	0.3	0.7	5.1

* Retracings.

then blinds 8, 1, 6, 7, 11, 2, 3, 4, 5, and 9. For the lettered turns, the turn at *E* is the most baffling one in so far as it has an extra right angled turn in it. It comprises 4.9 per cent of all errors made. The other turns in their order are *A*, *B*, *D*, and *C*.

No detailed analysis of the errors made, order of elimination, or methods of learning the maze will be attempted here because of the small number of cases recorded and also because this particular phase of the experiment, in the opinion of the writer, does not come within the scope of the material as treated in this article. Husband (2) makes a detailed analysis of the order of learning and individual errors made in his treatment of the high relief finger maze, although the pattern used is an entirely different one. Other investigators, Warden (14) and Hubbert (in the field of animal psychology (20)), have also gone into this phase of maze analysis. It remains for a later work to be done before any detailed analysis of errors or order of learning be attempted here where one is obliged to deal with such heterogeneous material consisting of all grades of intelligences from the feebleminded to the superior minded, all grades of emotional make-ups, and many races and nationalities.

5. Individual cases

Case M. J., figure 2. This graph shows quite clearly what is meant in the last sentence under section 3 on the Learning Curve. This boy was 16 years and 2 months of age chronologically at the time of the experiment. His IQ is 56, classifying him as a middle grade moron. He learns the maze in average time for his group and the curve is a fairly smooth and gradually descending one. Everything about this boy's behavior goes to show an equally stable personality. He is attractive, willing, coöperative and very amenable, but due to lack of judgment and discrimination, is weak and can be easily led.

Case E. D., figure 3. Contrast this picture with that of M. J. in figure 2. This boy is a very unstable, psychopathic homo-sexual Italian. At the time of the experiment he was 16 years of age. His IQ is 75. His personality traits are very effeminate. He loves house work, likes to sew, makes felt flowers, sings and dances. Ambition to be a fancy dancer. In the institution he was tractable and amenable to discipline, but had outbursts of temper that were at times evidence of his emotional

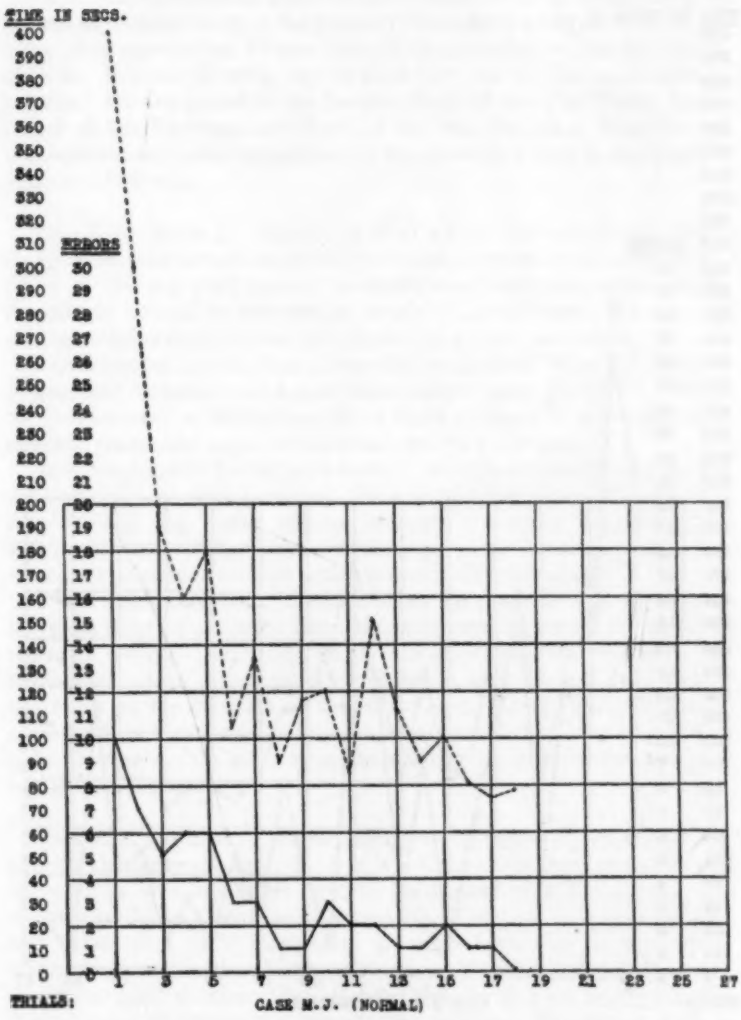

FIG. 2. CASE M. J. A SMOOTH AND GRADUALLY DESCENDING CURVE OF AN EMOTIONALLY STABLE BUT FEEBLEMINDED BOY 16 YEARS OF AGE WITH LIKEABLE PERSONALITY TRAITS. S.D. 2.74.

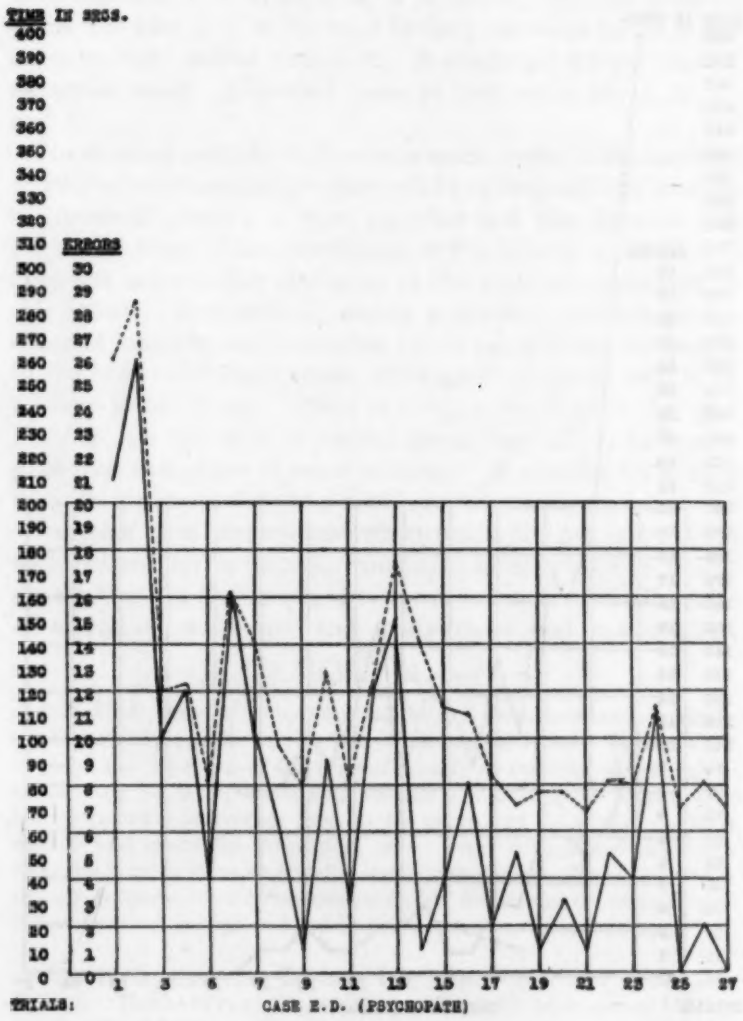

FIG. 3. CASE E. D. THE VERY IRREGULAR CURVE OF A 16-YEAR-OLD PSYCHOPATHIC HOMO-SEXUAL. S.D. 6.5
Contrast this with figure 2.

nature. His homo-sexual practices were the cause of his commitment to us, but as nothing much in the nature of treatment could be offered here other than segregation, he was released on probation within due course of time. Recent follow-up reports show that this boy has again been in trouble. He was placed in the Juvenile Ward of the City Prison, transferred to the Psychopathic Ward of the San Francisco Hospital for observation, and later committed by the Juvenile Court to the Preston School of Industry.

Case J. R., figure 4. This is a case of a frail 11-year-old boy who is much underweight and was much undernourished when he came to us. He is in the ungraded second class and does very poor school work. Reading is limited to very simple words of one syllable. He can add simple combinations of numbers, but his progress is very slow.

Psychological examination shows him to have an IQ of 67. Due to this mental deficiency and a poor home environment, he has been listed for commitment to the Sonoma State Home for the Feebleminded as he has been recognized as an institutional case for some time.

Emotionally, this boy is quite stable. He plays normally but is a bit shy and timid among older boys. He is careful in handling things and is very willing and easily adjusts himself. Generally considered, he is a model institutional boy and offers no cause for anxiety except a weakened physical condition which is now much improved.

A look at his maze learning curve shows the characteristic initial drop and from there on a more or less continuous series of errors all on about the same level; i.e. averaging about four errors per trial, except at the tenth trial where a large number of errors were made. This picture continues on for 41 trials at the same level. At the forty-first trial the experiment was stopped because it seemed evident that it would be some time before the maze would be learned due to both chronological and mental immaturity.

Case R. B., figure 5. Compare figure 4 with figure 5. R. B. is a boy exactly the same age as J. R., but is a highly organized and excitable little fellow who has never been in good stead with the group. His conduct record is a continuous succession of reports for minor offenses and infractions. His disposition is unpleasant. He is disorderly, teases, torments, scolds, kicks, fights, etc. He is underhanded, sneaky and thoroughly disagreeable. Besides this, he is a sex problem and a masturbator whenever the opportunity permits. His school work is fair, being in the fifth grade, but reports show his progress to be very uneven and spasmodic from day to day. He is definitely classed as a psychopathic personality. Psychological examination reveals an IQ of 101.

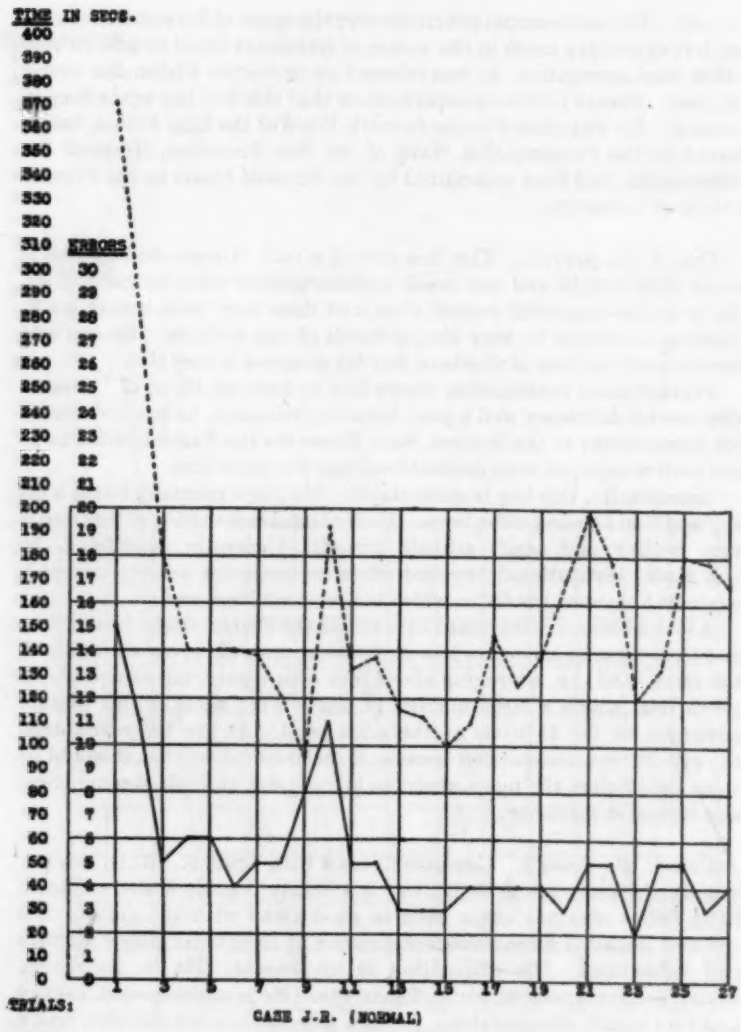

FIG. 4. CASE J. R. THE SMOOTH, REGULAR, PLATEAU-LIKE CURVE OF AN 11-YEAR-OLD BOY OF FEEBLE INTELLECT BUT VERY STABLE EMOTIONAL DISPOSITION. S.D. 2.07

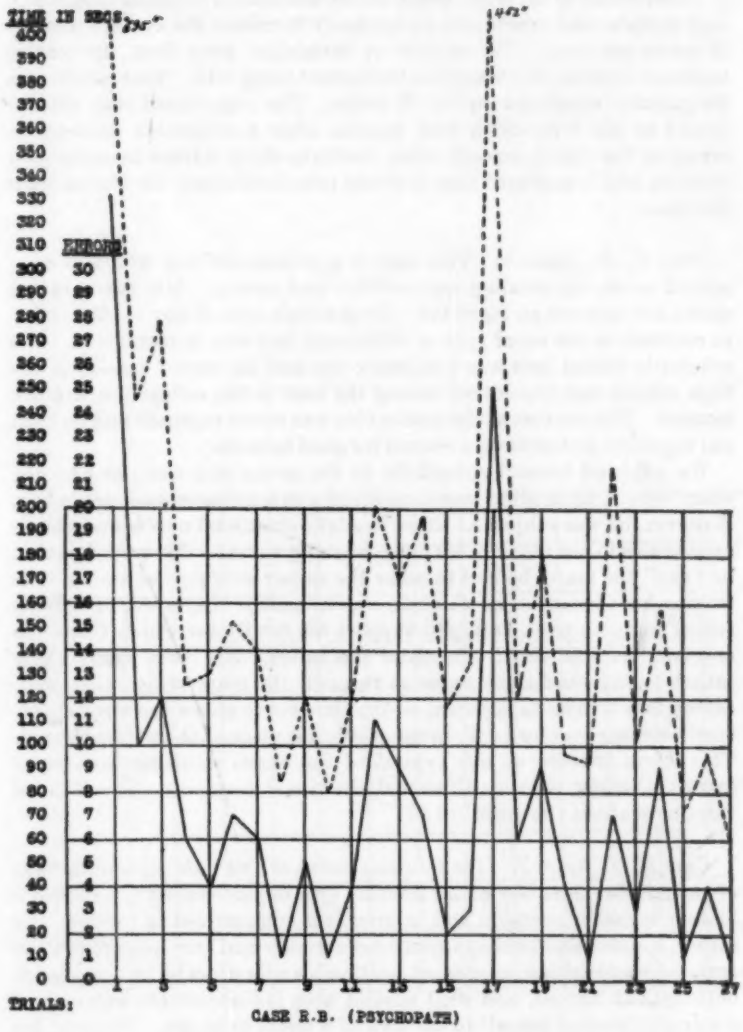

FIG. 5. CASE R. B. A VERY MARKEDLY ERRATIC AND IRREGULAR CURVE OF THE PERFORMANCE OF AN 11-YEAR-OLD BOY OF NORMAL INTELLIGENCE BUT WITH ALMOST FLAGRANT TYPE OF EMOTIONAL INSTABILITY. S.D. 6.17

Observation of his maze graph shows continuous irregularities, many high steeples and practically no tendency to reduce the average number of errors per trial. The amount of variability away from the central tendency is great, the Standard Deviation[3] being 6.17. This continuous irregularity continues on for 43 trials. The experiment was discontinued at the forty-third trial because after a noticeable decrease in errors at the thirty-seventh trial, the forty-third started in again with 9 errors, and it appeared that it would take indefinitely for him to learn the maze.

Case H. D., figure 6. This case is a 16-year-old boy who was committed to us for stealing automobiles and money. His Binet rating shows him to have an IQ of 114. He is a high type of boy intellectually in contrast to the usual type of delinquent boy who is committed. His scholastic record here was a superior one and his record outside in the high schools was considered among the best in the college preparatory courses. His conduct at the institution was above reproach and he went out regularly on Sundays, a reward for good behavior.

He adjusted himself splendidly to the group and was liked by the other boys. All in all he was considered a well adjusted and stable boy. However, he was subject at times to slight emotional upsets and this is even shown in the graph of his maze learning curve. The very day that he "ran" the maze, he had to make the rather weighty decision of continuing his education, in which he was intensely interested, or leaving school to go to work and help support his family for which there was necessity at this time. He chose the latter. But even under these rather trying conditions he went through the maze remarkably well, taking lots of time as is shown on the time curve above the error curve, and becoming confused only in one particular place at the sixteenth trial. This curve is more or less typical of the curve resulting from maze learning among persons of normal emotional make-up. The S.D. of this curve about the mean is 1.77.

Case E. O., figure 7. The learning curve of this case represents that of an Italo-Mexican boy with a schizoid type of personality.[4] This boy's history is rather complex, but in brief it is summarized as follows: His father, a suave and brilliant man intellectually and very talented in the arts, took to drinking, carousing, beating his wife when he had emotional outbursts of temper, and went around with indiscriminate women and gradually lowered himself to the level of a moral imbecile. Tiring of his wife, a clever little Italian woman, and their three sons, he deserted the

[3] See Section 6 under *Results* for discussion on A Unit of Measure.

[4] For learning in Dementia Praecox, see Boring (18).

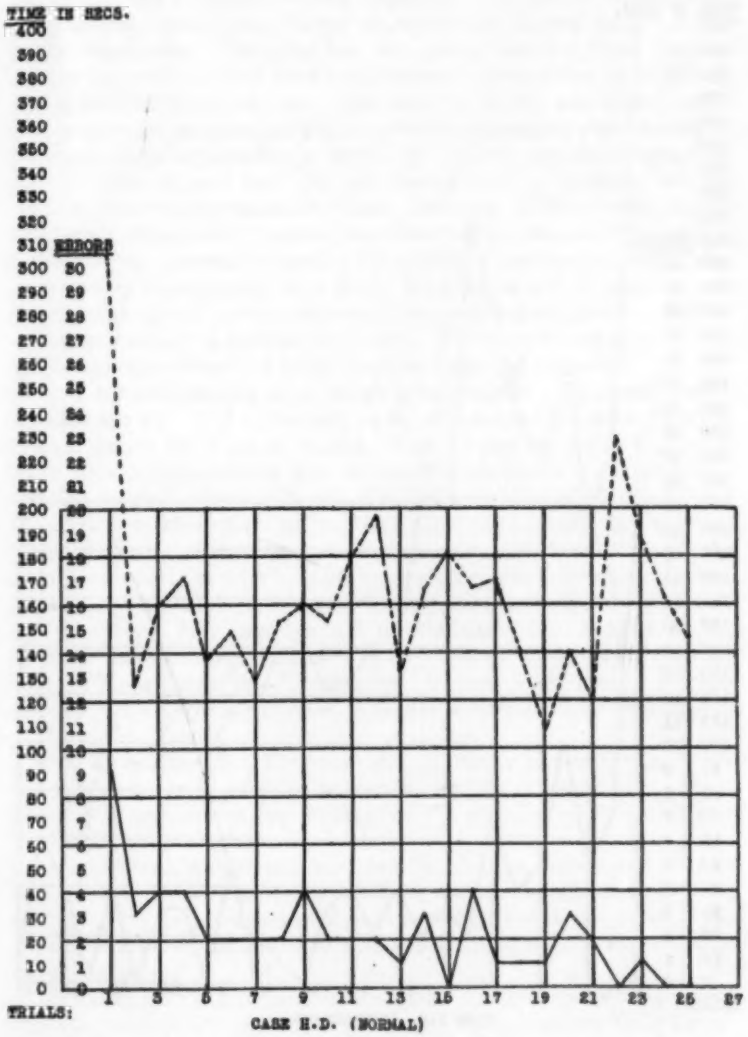

FIG. 6. CASE H. D. A SMOOTH GRADUALLY DESCENDING CURVE OF A 16-YEAR-OLD BOY WITH SUPERIOR INTELLECT WHO IS PERFECTLY ADJUSTED AND WHOSE EMOTIONAL NATURE IS QUITE STABLE. S.D. 1.77.

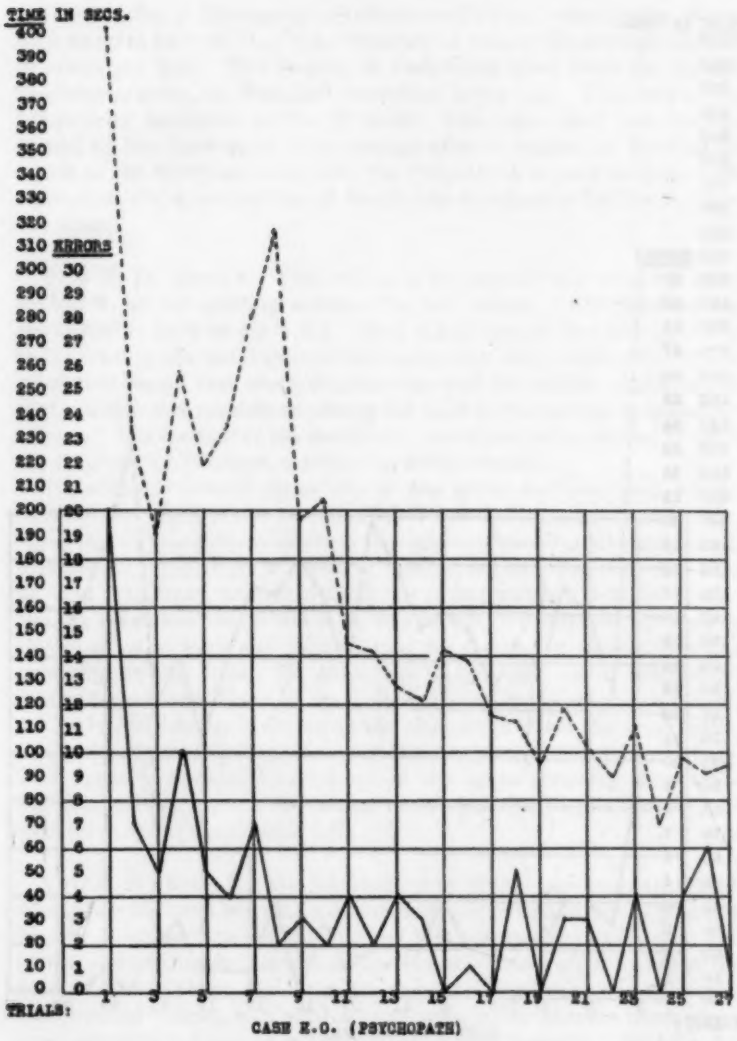

FIG. 7. CASE E. O. THE IRREGULAR AND BROKEN CURVE OF A 17-YEAR-OLD BOY WITH A DEMENTIA PRAECOX TYPE OF MAKE-UP.
S.D. 3.84
Compare this curve with figure 6

family and fled to Mexico several years ago. The family became destitute, the two older sons became wayward and showed many psychopathic tendencies. The older boy was committed to a State Hospital for the insane because of emotional outbursts, annoyance to neighbors, and general atypical behavior. The next boy, E. O., was committed to this institution as a sex problem in so far as he annoyed older women by making indecent approaches to them. E. O. never associated with other boys or girls his own age. He was always shut-in, brooding, and his mind centered mostly on sex matters. He began to deteriorate rapidly and psychological examinations from time to time showed IQ's varying from 92 to 80. He was advised of his condition and was induced to sign a voluntary commitment to a State Hospital at which place he was sterilized and given routine treatment for a period of six months. He was discharged and lived at home for a time. He recently got into trouble again and was committed to the Preston School of Industry.

E. O.'s maze learning curve shows quite definitely his unstable emotional make-up. The curve runs on for 34 trials in the same irregular manner before the maze is learned. The steeples are not as high as in other psychopathic curves, but the significance lies in their irregularities, consequently the S.D. is only 3.84, but inspection of the graph itself is sufficient to show that the boy does not react normally to situations under pressure. The time curve in this case also shows some peculiarities, especially at trial 6, where a decrease in errors shows an increase in time. This phenomenon is described by Snoddy (6), as "irradiation." A discussion of this situation will be eliminated here because we are concerned more with peculiarities of the error curve than with the time curve. To say that this "irradiation" is most likely due to extreme caution while learning the maze, is for our purposes probably sufficient.

Case E. K., figure 8. The curve of E. K. shows an intermediary type of learning curve of a boy of border-line emotional instability. He is 15 years of age, makes fair progress in the seventh grade, and has an IQ of 84.

His inherent weaknesses are manifested in a sullen and morose disposition. He will remain in a sulking state for long periods of time, and again will be in a semi-elated and happy frame of mind. Most of the time he will do what is asked of him, but at times will absolutely refuse to do anything.

He comes from a very unfortunate family. Home conditions are poor and his father is serving a term in the State Penitentiary for robbery. His older brother was recently hanged at the same penitentiary for running amuck one night in San Francisco and killing several people.

The boy himself was committed to us sometime ago and charged with a long series of burglaries. He is now released on probation and living with his mother.

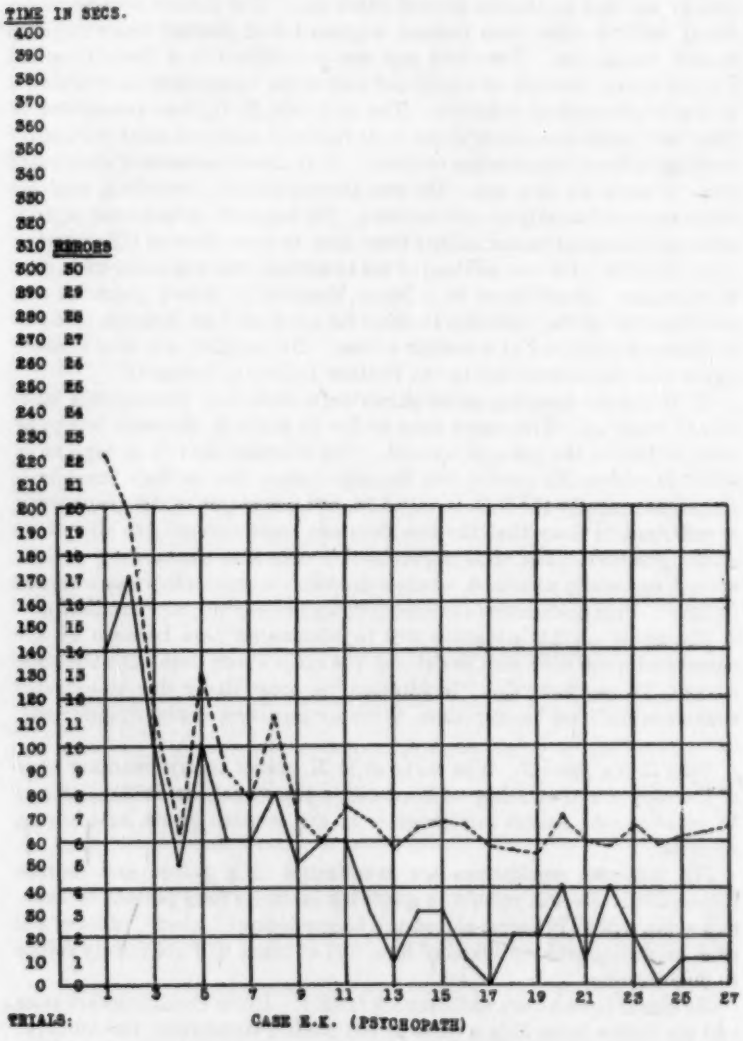

FIG. 8. CASE E. K. A BORDER-LINE TYPE OF CURVE, GRADUALLY DESCENDING AND WITH DECREASING NUMBER OF ERRORS, BUT WITH SUFFICIENT IRREGULARITIES CHARACTERISTIC OF BORDER-LINE EMOTIONAL INSTABILITY. S.D. 4

E. K.'s maze learning curve shows irregularities, but with a general tendency to continually decrease the average number of errors. The curve runs out to 33 trials with one more irregularity than is shown on the graph. The time curve remains quite regular after the 13th trial despite the irregularities in the error curve. The S.D. of this curve is 4.

Of course, all learning curves based upon the use of this particular type of maze are not as clear cut as the ones shown in this article, but the differences in maze performance between real psychopathic personalities and so-called normal personalities are so great that immediate inspection of the individual charts is almost diagnostic in itself.

This maze learning test could probably be listed as a differentiating test and used to augment such pioneer work as done by Fernald (19), Pintner (23), Porteus (24), Wells (25) and others.

Much more work needs to be done in this field in order to determine reliability before the diagnosis of instability by this method be attempted. Nevertheless, the summary of the sample work shown here is fruitful enough to stimulate further research and a more thorough study of maze learning in relation to emotional instability will be carried on in the near future by this department.

6. A unit of measure

It was considered proper in order to aid in standardizing this emotional test to use some sort of unit of variability about which one could set the limits separating an unstable performance from a stable one. Various methods were tried without success as the values assigned to each case often overlapped and no arithmetical distinction could be obtained.

Finally it was decided to use the Standard Deviation as the unit of variability about the central tendency. This, however, is not altogether satisfactory and more work needs to be done in this regard, as certain overlappings are evident as shown in the S.D. column of table 1. Nevertheless, the aggregate averages of both groups show nominal differences, the average S.D. for the normal group being 2.92 and that for the psycho-

pathic group being 4.19. Just what limits could arbitrarily be taken to designate a normal performance from an abnormal one is a matter for further study on a much larger group of individuals than are here presented, but it would almost be safe to say that any performance showing an S.D. of more than 4 should be looked upon with suspicion. Although a few S.D.'s among the normal group closely approach this limit and one steps over it, and several in the unstable group are under this limit, inspection of the latters' charts certainly shows an abnormal performance.

Altogether, pure inspection of the curve at the present phase of development is the best method of determining an abnormal performance from a normal one.

These overlappings of standard deviations are due to factors in the learning curve other than pure irregularities of performance. The greatest factor involved in obtaining a large S.D. is of course in the amplitude of these irregularities away from the mean, although a large S.D. is also obtained where an individual starts with a large number of errors and decreases them rapidly without any further increases. Thus the curve shows no irregularities at all and can be considered a perfect learning curve, but if taken on the basis of the S.D. as a determiner of instability, this individual would be the most unstable one of the lot as exemplified clearly in case D. A. of the Psychopathic Group shown in table 1. This boy is certainly a psychopath, but has a remarkable gift for rapid memory. Another type of maze, equally as difficult as the one used here was used as a check in this case, but an even more phenomenal result obtained, he learning the latter within 2 trials. However, this is a "special ability" (Hicks and Carr (5)) to learn the maze problem and is not to be confused with a stable and normal type of response.

Other cases in this same group show a small S.D. because of restricted amplitudes in the curve but inspection certainly shows an abnormal performance. On the other hand, the truly unstable individual and clear cut text book type does show wide amplitude in the curve and consequently a large

S.D. and the other irregular curves with small amplitude and small S.D. are more characteristic of borderline cases. Therefore if the curve shows irregularities and also a large S.D. (4 or more), it is fairly certain that one is dealing with an emotionally unstable individual, but as is shown in exceptional cases this is not always so especially where the curve is smooth but drops suddenly and contains no steeples. In these cases other criteria must be employed.

7. Statistical treatment

Until now we have been considering individual cases for the most part. Table 1 shows briefly the results of the whole group of twenty boys divided into their two classifications; the Normal group on one side and the Psychopathic group on the other. The differences between the two groups in the aggregate is almost as striking as the individual cases cited above.

The chronological ages of both groups average within 7 months of being the same. It will be noticed that for the normal group the average number of trials required to learn the maze is 16.4, while for the other group the figure is 24.7 trials. The differences are equally significant for the time and errors. The average time taken for the normal group to learn the maze was slightly over 32 minutes and for the psychopathic group, 50 minutes. The average number of errors for the first group being 51.8 and the second group, 112.3. If all the cases in the psychopathic group (some not included in the table) were carried to completion, the differences would have been greater than shown, but such a treatment with a few individual cases to be included in the averages would hardly be considered good statistical procedure.

SUMMARY AND CONCLUSIONS

Much has been done in the field of kinaesthetic motor learning, but restriction of such learning to the objective study of emotional stability, or rather instability, has been confined to very few investigators. The investigations by the writer

along these lines (although few in number) have led to the following conclusions:

1. That the high relief finger maze offers a very convenient and simple type of apparatus for the study of emotional reactions through motor learning.

2. That the maze used is sufficiently applicable to both children and adults.

3. That the learning of this maze is difficult enough usually to give a curve of sufficient length to allow for analysis.

4. That noticeable differences of performance occur between individuals (carefully selected) of a stable emotional make-up and an unstable emotional make-up.

5. That the reactions of unstable individuals in learning to image the true path of the maze were of such a nature that obstructions, false leads not previously experienced, etc., caused a very erratic and irregular performance; the maze being practically learned, a new experience of this kind would cause the errors to increase noticeably.

6. That normal, stable individuals did not allow these obstructions, new experiences, etc., to influence their learning processes to any noticeable extent as they could adjust themselves to meet the demands of the new situation.

7. That there is practically no correlation between the learning of the finger maze and the intellectual capacity of the learner.

8. That adults and older children learn the maze more rapidly, in fewer number of trials and with less errors than do younger children.

9. That the use of the finger maze is advantageous in the study of differences in stability between individuals because it practically shuts out of the situation the factors of IQ, visual sensations, auditory sensations, and a great amount of reasoning due to the almost entirely trial and error methods necessary at the start, leaving irregularities of performance due to false moves, etc., at the mercy of emotional reactions during the learning process.

10. The high relief finger maze can be used in most cases as a diagnostic aid in differentiating emotionally stable from emotionally unstable individuals.

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THE AVOCATIONS OF ONE HUNDRED COLLEGE FRESHMEN

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Ohio University

Is college life one grand round of pleasure interspersed with occasional bits of mental effort in order to avoid the official axe, or is it a strenuous intellectual endeavor with an occasional good time thrown in to avoid monotony? Recent popular books, magazines and movies tend to convey the impression that the former mode of activity is almost exclusively followed by undergraduates. Such a generalization is unwarranted. Colleges differ in their ideals and atsmopheres. Furthermore students within the same college vary markedly in their attitudes toward studies and recreation. The authors of this article were interested chiefly in student variability with respect to play rather than any comparison of institutions. They wanted to know whether the popular college hero of the movies who lived in an orgy of ukeleles, dances, etc. really existed, and if he did exist whether he was clever enough to "get by" the barbed wire entanglements of examinations, requirements, deans and teachers which stood between him and a degree. The movie hero outwits the college authorities. Does the actual college spendthrift of time and energy do so? Furthermore the authors wanted to know whether capability as a student was in any way related to the amount of his play. And finally they wanted to know what college boys prefer to do with their spare time.

In order to discover the things which they wished to know they selected a group of one hundred college freshmen boys. These boys were so selected that twenty came from each quintile of the range of intelligence found at this institution. Ohio

State University tests were used to measure intelligence. In all other respects the selection favored a random sampling. Information about their extra-curricular activities was obtained by means of a standardized interview. A list of the various things which freshmen might do was prepared and then each boy in the group of one hundred was asked to tell how much he had indulged in the activities listed and to append any forms not appearing on the list. His confession was to cover the period of a month. The time represented in the study falls from the middle of February to the middle of March. In a few cases the time was about a week later and some unusually warm weather caused the inclusion of a slight amount of track, tennis and baseball. Otherwise the season and its activities were practically homogeneous.

The extent of activity in any particular form of recreation was measured in one of two ways, viz., the number of times which a given thing had been done or the amount of time spent in doing it during the past month. It was virtually impossible to reduce all measurement to a single form of unit. For example a boy could easily remember how many basketball games or concerts he had attended in the last month but not how many hours he had spent in attendance. In other fields such as reading it was easier to estimate the amount of time spent rather than the number of occasions on which reading had been done. It is perfectly possible, however, to lump these two units of measurement together and produce an index of participation which permits valid comparisons to be made between groups and individuals. This was done in part of the study.

What does the college freshman prefer to do for pleasure? Of course the answer to that question will vary somewhat depending upon the season, but we can answer it for the season studied here by examining the following table. In it are listed the various activities reported in order of the number of participants. This gives a fairly good index of the relative popularity of recreations judged by the number who chose them.

Rank	*Form of Recreation*	*Number of Participants*
1	Movies	96
2	Magazine reading	79
3	Social conversation (own sex)	77
4	"Dates"	70
5	Card playing	69
6	Basketball games attended	66
7	Hikes	63
8	Walks	63
9	Recitals	62
10	Automobile rides	62
11	Pool and billiards	60
12	Book reading	58
13	Plays	56
14	Dances	50
15	Club meetings	47
16	Basketball (played)	42
17	Wrestling	40
18	Kodaking	37
19	Individual hobbies	36
20	Social conversation (opposite sex)	35
21	Gymnastic stunts	35
22	House parties	30
23	Lectures	29
24	Musicals	27
25	Playing musical instruments	26
26	Checkers	26
27	Radio	21
28	Church parties	18
29	Indoor ball (played)	13
30	Tennis	10
31	Track	10
32	Volley ball (played)	8
33	Boxing	7
34	Bowling	7
35	Volley ball (attended)	6
36	Indoor ball (attended)	6
37	Chess	6
38	Field glass observing	6
39	Horse-back riding	4
40	Wood carving	3
41	Swimming	3
42	Dominoes	2
43	Baseball	2
44	Skating	2
45	Golf	1

Peculiar and personal forms of avocations were listed under the head of "Individual hobbies." In general the list shows rather well the status of the various recreations at the season when winter is waning and spring has not yet arrived. It is not to be assumed that baseball has lost its popularity because it appears low in the list but rather that it is something rare at this season of the year. The same thing may be said of a number of other sports.

There are two striking facts to be noted from the above list. One is the almost universal appeal of the movies. The second is the marked preference for sedentary forms of recreation. The highest six forms of entertainment on this list are sedentary and not until the sixteenth is reached do we find a really strenuous game. Basketball, the most popular strenuous sport, is played by hardly half as many as attend the movies. The number of boys attending basketball games is 57 per cent greater than the number playing. Evidently preference for spectatorship is not wholly a matter of years, stiff joints and hardening arteries. In general sedentary forms of recreation were preferred about two and one-half times as frequently as active sports. This might not be as true for some other season of the year, but probably it is a part of the general tendency toward sport for the few and spectatorship for the many which seems to be the trend of modern athletics. The list inclines one to the view that the boys were seeking pleasure more than recreation. The two should, of course, be taken simultaneously but all too often the freshman seems to be getting much of the former and little of the latter.

The number of different activities engaged in during the month by various freshmen ranged from four to thirty-one. The middle 50 per cent was content with anywhere from 11 to 18 different kinds of recreation and three quarters of the boys were satisfied with a number between 10 and 20. Of course the total number of activities for a year would be greater than the number in a given season, but what the number for a year would be we have no way of ascertaining.

What manner of freshman plays most, the dull student or the bright? If we throw together the number of hours reported in

some activities and the number of times that other recreations were followed, it is possible to use the sum as a rough index of the quantity of participation. Now when the one hundred freshmen were separated into quintiles on the basis of their scores on the Ohio State University Test and the sum of the indices for the members of each group was obtained, the following table resulted.

	INTELLIGENCE QUINTILES				
	I	II	III	IV	V
Indices of participation.....	1599	1881	1774	1999	2022

Obviously the general trend is for the more intelligent freshmen to play more—the highest group spending 25 per cent more time at their avocations than the lowest group. This finding seems to fit in with the results obtained in questionnaire studies of the amount of time students spend in study. In these studies the dull student far exceeds the bright student in the number of hours devoted to conning his lessons.

The question of why the bright student plays more on the average than the dull one can be answered only in terms of speculation. Probably the bright students are capable of competing on equal terms, or even better terms, with their less gifted fellows with comparatively little effort. If marks are issued to students on the basis of the normal curve of distribution then the bright student who merely wishes to "get by" has only to do a little better than the four or five poorest in the class. This he can do with comparative ease and have much time left for his avocations. Possibly the greater amount of time spent in play on the part of the brighter students may indicate a larger amount of energy seeking release. If that be true then we must immediately face the question of why more of his energy is not expended in things intellectual rather than in things convivial. The answer to this query would probably be that the attitude of the typical college freshman toward studies is that of a small boy toward chores which must be done. The

love of learning has not yet been born in him and until it is he will calculate on as little effort as possible to be expended in intellectual endeavors and as much as possible to be released in the search for pleasure.

The brighter students do have more intellectual curiosity than the duller ones—not as evidenced by their devotion to studies but as indicated by the amount of reading which is done for pleasure. The per cent of readers from each quintile of the intelligence scale is as follows:

	INTELLIGENCE QUINTILES				
	I	II	III	IV	V
Per cent which reads books.....	40	50	60	60	80
Per cent which reads magazines..	60	30	75	90	100

Probably a safe generalization would be that there are twice as many readers for pleasure among the brightest students as among the dullest. Furthermore these bright students read a better type of magazine than the dull students do. The number of readers of notably light magazines was small but all of the readers were in the three lowest quintiles.

The brighter students also showed a greater preference for plays and dances but for other forms of recreation displayed no greater like or dislike than the duller students. With the exceptions of reading, plays and dances, the forms of recreation chosen by college freshmen do not seem related to differences in intelligence. Neither does there seem to be any relationship between intelligence and preference for sedentary games for in general most of the boys participated about two and a half times as much in sedentary games as in active sports. There is a slight relationship between the number of activities pursued and intelligence. Apparently the brighter students prefer more variety for we find the median number of activities ranging from 14 in Quintile I to 17.5 in Quintile V.

Now what happens to the collegiate waster of time? Does he eventually walk the academic gangplank or does he graduate

with a "gentleman's mark" and a diploma indistinguishable from the one handed to the Phi Beta Kappa student? The limits of this experiment would have to be extended to four years instead of a single semester in order to answer this question authoritatively, but probably the results of the first semester will give a fair basis for predicting the fate of the college play boy.

In the institution where this study was made a point system of marking is established so that a single hour course for one semester if completed with a mark of "A" counts 3 points. Each semester hour of "B" work counts 2 points; "C" counts 1 point; "D" for zero points; and for comparative purposes "E" counts for minus one point and "F" for minus two points. Usually a student is expected to carry sixteen hours of work including physical education. The requirements for graduation are such that a student must make an average of 16 points per semester in order to graduate in the minimum time. In this study we have grouped the freshmen into two groups—successful and unsuccessful in accordance with whether they made 16 points or not during their first semester. The number of points each student made was obtained from the records of the institution.

Only one-fourth of the freshmen who were participating *more than three-fourths* of their fellows in recreative activities succeeded in making 16 points. On the other hand half of the students who were participating in play *less than three-quarters* of their fellows succeeded in making 16 points. In other words the freshmen who played most had just half as much chance of being successful students as the freshmen who played least. Of the nine most self-indulgent freshmen only one made 16 points and it should be noted that his favorite avocation was reading. That the poor showing of these nine is not due to lack of intelligence is proved by the fact that they are all above the lowest quintile in intelligence. Evidently making a vocation of one's avocations is an almost sure means of producing a school failure.

Another bit of evidence that too much recreation is harmful

to college success is furnished by the fact that 64 per cent of the unsuccessful students exceed the median of participation set by the successful students. The median of participation for successful students is 80; for all students 91.2 and for the unsuccessful it is 100—25 per cent greater than that of the successful students. The variation in amount of activities for successful and unsuccessful students is also very different. For the successful students the range of the indices of participation is from 12 to 164 while for unsuccessful students the range is from 17 to 293.

Recent studies are proving that the capable student does not turn out to be the harmless, useless, walking edition of an encyclopedia which he was, and often is yet, supposed to be. Therefore a little attention will be given to the habits and traits of the best students in this study. Of the seven men who made 30 points or more during the semester, 6 have indices of participation which are below the median index for the whole group and the remaining man is at the Q_3 point. None is an excessive indulger in extra-curricular activities. Four of the seven are in the two highest quintiles of intelligence and the other three are in the middle quintile of intelligence. Evidently a combination of good native ability and industry is still necessary if one wishes to be an outstanding student.

On the other extreme of scholarship were nine men who made zero points or less in scholarship. Of these nine, five had indices of participation less than the median for the entire group. Evidently refraining from extra-curricular activities in excessive amounts is not enough to save a student from receiving his passports to other scenes. Lack of native ability seemed the largest factor in the difficulties of these nine for five of them came from the lowest quintile of intelligence; and although four of these five refrained from excessive indulgence in play yet their abstinence was not enough to save them from making miserable failures. Three of these nine poor failures came from the second lowest quintile of intelligence and two of them were undertaking to indulge in more than the median amount of fun—a combination which proved disastrous. The remaining

man of the nine came from the third quintile of intelligence (a quintile which produced three excellent scholars) but he was indulging in extra-curricular activities to a greater extent than three-quarters of his fellows, so he fell by the wayside. Evidently low intelligence and a high degree of interest in play are both factors of moment in explaining school failures. For high scholarship, however, both good intelligence and moderation in play are necessary.

SUMMARY

(1) As a whole the 100 college freshmen boys studied are prone to spend too much time in sedentary forms of avocations which are apt to be more amusing than recreative; (2) the more intelligent freshmen play about 25 per cent more than the less intelligent; (3) there is no particular relation between intelligence and choice of avocations except that the bright students show a marked preference for reading and some preference for plays and dancing; (4) the bright students have a somewhat greater variety of fun than the duller students; (5) excessive indulgers in extra-curricular activities had at least twice as much chance of failing as freshmen who practiced moderation in pleasure seeking; (6) refraining from extra-curricular activities alone is not enough to make a good student —the outstanding students had high intelligence plus moderate habits; (7) immoderate pleasure seeking is almost a certain bar to high scholarship; (8) low intelligence plus excessive indulgence is almost certain to place one's feet on the academic gangplank.

MENTAL TEST FINDINGS WITH ARMENIAN, TURKISH, GREEK AND BULGARIAN SUBJECTS

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Constantinople Woman's College

The interest which is attached to the measurement and comparison of the intelligence and educational achievements of different races and nationalities emboldens the writer to present the results of an intelligence test given at the Constantinople Woman's College despite the fact that these results must be considered merely as tentative and suggestive. The reasons why they cannot be considered conclusive will be indicated in the discussion; primarily, however, they suffer from that most grievous of all defects in testing, "too few cases."

Dr. Margaret Landes, Professor of Psychology at the College, kindly coöperated in administering and scoring the test which was given as an experiment. No previous intelligence tests had been given at the College and it did not seem wise "to spring" too thorough a testing program at first,—either to ask to have the regular classes suspended for three hours in order to give one of the longer tests or to make the test obligatory for all students. The problem of finding the time in which to give a test was largely obviated by selecting the Otis Self-Administering Test of Mental Ability, Higher Examination, Form B which can be given in a forty-five-minute lecture period. There was a question as to how the students would react to the idea of the test, it being feared that they might not be willing to take it; but, happily, when something of the nature of intelligence tests had been explained to them their response was eager and enthusiastic. All the Sopohmores and Juniors took the test and all the Seniors but one. The test was given to these three advanced classes only as it was thought that the language

handicap in the Freshman and Introductory Classes would be so great as to invalidate the results. The Freshmen, however, felt so badly at being omitted that it was regretted that sufficient copies of the test had not been ordered for them.

The Constantinople Woman's College ranks as a lycée in Turkey and more nearly parallels the junior college in the United States than it does the senior college in the preparation and ages of the student body and in the standard of the work. In the Turkish educational system there are five years in the primary school, three years in the intermediate or preparatory school, and three years in the lycée. Though ranking as a lycée the Constantinople Woman's College requires four years in its preparatory school and four in the college making a total of thirteen years of schooling as opposed to fourteen for the completion of the American junior college and sixteen for the senior college. The usual age at which freshmen enter is sixteen. Any comparison of the students of the Constantinople Woman's College with those in American institutions should be made with reference to this difference in ages and years of preparation.

Not all the students in the College come from the College Preparatory School, some come from the American mission schools at Scutari, Brusa, and Gedik Pasha, and others come from their own preparatory schools and lycées. Unless they know English these students enter the College Introductory Classes and devote two years to the intensive study of English. At the end of this period good students have a sufficient knowledge of the language to enter the College classes. Graduates of lycées may enter the Junior Class while others go to the Freshman or Sophomore Classes according to their previous preparation. Thus the number of years which students in the same class in the College have studied English varies greatly. Some students in the Sophomore Class, for instance, have had five or six years of English and others only two. The advantage in a test where speed is a factor of importance is certainly in favor of those students who have the longer familiarity with the English language, they think faster in English though perhaps

no more accurately. Compared with students whose native language is English, most if not all of the students of the Constantinople Woman's College suffered an appreciable language handicap. Some measure of this handicap is revealed when we study the results obtained for the different classes which are given in table 1.

Although there is overlapping the mean of the Seniors is above that of the Juniors and the Junior mean is above that of the Sophomores. Subject to the assumption that these classes are fairly representative the differences are found to have a high degree of reliability; i.e., 99 times in 100 the Seniors will rank above the Juniors and 97 times in 100 the Juniors will rank

TABLE 1

IQ's of students in the Constantinople Woman's College obtained by the Otis Self-Administering Test of Mental Ability, Higher Examination, Form B

CLASS	NUMBER TESTED	RANGE	MEDIAN	MEAN	S.D.
Seniors	45	121–82	98.50	99.17	8.94 ± .94
Juniors	35	110–81	95.17	95.16	6.86 ± .82
Sophomores	40	116–76	89.88	91.83	8.39 ± .94
Total	120	121–76	95.00	95.55	8.76 ± .57

above the Sophomores on the Otis Test. Three factors at least contribute to this difference between classes: (1) the two upper classes are more highly selected as the poorest students tend to be eliminated each year; (2) the language handicap is lessened each year; and (3) the ability to use the information which they already have in the mastery of new situations has been strengthened in the upper classes by the additional training each class has had over the one below.

The effect of the first of these factors, that of selection, can be eliminated since those students who are failing in their work are known,—three Sophomores do not pass to the Junior Class and six Juniors are conditioned as Seniors. If we omit the IQ scores of these students, the mean IQ's of the Sophomore and Junior Classes are raised but the relative position is not changed.

The corrected mean for the Juniors is 96.22 with a standard deviation of 5.68, and for the Sophomores, 92.26 with a standard deviation of 8.55. The reliability of these corrected scores is also high, 97 times in 100 for a difference between Juniors and Seniors and 96 times in 100 for a difference between Juniors and Sophomores. The difference between Seniors and Sophomores is certainty.

The extent to which each of the two other factors, language and training, influences the results cannot be determined with the present data. If we could assume that intelligence tests measured native intelligence, pure and simple uninfluenced by training, the illusive factor of training could be omitted but unfortunately it cannot. It plays a part, and in the opinion of the writer, a probably greater one than the language handicap in accounting for the difference between the classes and for the low median IQ, 95, of the group as a whole in comparison with the norm of 100 established by the Otis Test for unselected groups in the United States. The norms for high school and college students which are selected groups are considerably above 100. The median IQ given by Dr. Otis for 524 college students is 118. Most of the students of the Constantinople College have received their elementary training in schools where the emphasis has been placed on rote memory work rather than the ability to reason. The students learn vast amounts of information verbatim but are often utterly at a loss in applying it. The unusual questions that appear in the intelligence test confuse them even if they are fully conversant with the vocabulary used. The efforts of the teaching in the College are directed toward training the student to think rather than to memorize and a real improvement can be detected in the work of most of the students in their Senior year if not earlier; they have learned to expect the unexpected and they are better prepared to grapple with it. The writer is able to check the results of the test with a personal knowledge of the work of each of the students tested furthered by that of other members of the faculty and it seems reasonably certain that if the language and training handicaps were removed, the mean IQ of

the group would reach 100 or even a few points above. More and careful testing is needed to determine the true level of mental ability for this student group.

The correlation between mental ability as measured by the Otis Test and scholarship is given in table 2.

The degree of correlation between the IQ scores and the scholarship mean for the group is a moderate one, .402, and lower than those reported for the test for three groups of American high school students which were .55, .57, and .59. This lower degree of correlation is to be expected because of the disturbing factors of language and training. The correlation for the Senior Class, .483, is appreciably higher than the correlation coefficients found for the Junior and Sophomore Classes which is also to be expected. The Senior coefficient may be considered reliable in that it exceeds four times its P.E.; the coefficients for the Junior and Sophomore Classes on the other hand are exceeded by four times their P.E.'s and cannot therefore be considered reliable. Because of the small size of the samples, individual cases affect the results unduly and it is possible through a personal knowledge of the students tested to account for the low coefficients of correlation of the Junior and Sophomore Classes. A number of girls in the Junior Class who are bright and have good IQ scores have low grades because they neglect their work for other interests, while a number of Sophomores who have high grades have low IQ scores because

TABLE 2

The correlation of the means of the scholarship ratings of the students of the Constantinople Woman's College for the year 1927–1928 with the Otis Test

CLASS	NUMBER TESTED	SCHOLARSHIP MEAN	S.D. OF SCHOLARSHIP MEAN	MEAN IQ	PEARSON r ± 4 P.E.
Senior	45	85.83	4.97 ± .52	99.17	.483 ± .31
Junior	35	77.36	6.15 ± .74	95.16	.298 ± .42
Sophomore	40	79.00	7.43 ± .83	91.83	.324 ± .38
Total	120	81.08	7.25 ± .47	95.55	.402 ± .23

they have been promoted to the Sophomore Class with only two years of English and they do not work rapidly enough in English to make a good showing. Retesting these students in their Junior and Senior years would no doubt show a great improvement in their IQ scores.

The Senior scholarship mean is high and this class enjoyed the reputation of being an unusually gifted class, while the Juniors on the other hand suffered by the contrast almost to the point of acquiring an inferiority complex as a class. Ability in the Sophomore Class is uneven but on the whole good.

The language and background problems at the Constantinople College are further complicated by the fact that the

TABLE 3

The mean IQ scores established by the Otis Test and the mean scholarship ratings of the four principal nationality groups at the Constantinople Woman's College

NATIONALITY	NUMBER TESTED	MEAN IQ	S.D.	SCHOLARSHIP MEAN	S.D.
Armenians	27	94.28	8.10	81.76	4.66
Turks	26	95.50	9.74	80.58	8.10
Greeks	23	92.63	5.89	79.02	7.14
Bulgarians	20	96.00	9.10	83.50	7.52

student body is composed of many different nationalities speaking different languages. Armenians, Turks, Greeks, and Bulgarians form the four largest groups, but there are also a number of Jews, mostly of Spanish origin, and a few each of Russian Roumanians, Albanians, Italians, Persians, Syrians, English, and Americans. The scores of the one English and three American students who took the test were not included in obtaining the results which are given in this paper. The results for the four principal nationality groups are given in table 3.

The number of cases in each group is so small and the differences between the groups are so slight that we must be cautious in interpreting the results. If we take the reliability of the difference between the mean IQ's of each of the groups in terms

of the standard error of the difference and then translate into chances, we find that there are:

58 chances in 100 that Bulgarians will rank above Turks
93 chances in 100 that Bulgarians will rank above Greeks
73 chances in 100 that Bulgarians will rank above Armenians
90 chances in 100 that Turks will rank above Greeks
71 chances in 100 that Turks will rank above Armenians
80 chances in 100 that Armenians will rank above Greeks

These differences in rank are valid and significant only if we make the assumption that our samples are fairly representative of successive samples similarly selected from each of the nationality groups. This is an assumption, however, that we cannot make without further investigation. We must also further assume that our samples of the different nationality groups are similarly selected to begin with. It seems safe to assume this for the Turks, Greeks, and Armenians; there are girls from homes of culture and comfort in each group together with the daughters of servants to whom scholarships have been granted, —on the basis of need very often rather than ability. The Bulgarian group is more highly selected. Since these girls come from a distance they must necessarily all be boarders and this greater expense tends to eliminate students whose work is poor, —their parents will not continue to make the financial sacrifice necessary to keep them at the College. The boarding students also have a better opportunity to perfect their English and more favorable conditions for study.

SUMMARY

A brief summary of the conclusions that may safely be drawn from this testing experiment brings out the following points:

1. That a thorough testing program is needed in order to establish the norms for this group of students.

2. That these students suffer from handicaps in language and training that need to be borne in mind in comparing the results of this test with those of American students. These handicaps

should be kept in mind by teachers in making assignments. The tendency of new teachers at the College is to expect too much at first and failing to get this to expect too little later. There is also a tendency to expect too much of the Sophomores and too little of the Seniors. The use of intelligence and achievement tests promises to be a help in solving this difficulty and in standardizing the work of the Constantinople Woman's College with reference to that of similar institutions of learning in the United States.

THE RELATIVE VALUES OF POSITIVE AND NEGATIVE ADVERTISING APPEALS AS MEASURED BY COUPONS RETURNED

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Dr. A. T. Poffenberger of Columbia University has said that, "One of the most disputed questions among advertising specialists concerns the relative value of positive and negative appeals."[1] A copy writing supervisor in one of the world's leading advertising agencies verifies this statement, and adds that the question is discussed, argued and rationalized weekly in practically every advertising agency in the country. The material which follows represents an attempt to compare the values of positive and negative appeals through practical results in the advertising field. The return coupon was used as the measure of the success of each appeal. There are inevitably many uncontrolled factors influencing such a study, but a random selection of more than 200 different pieces of advertising copy such as were used should minimize the error. All objective values were balanced as far as possible and many of these factors will be mentioned in this summary of the investigation.

HOW THE POSITIVE AND NEGATIVE APPEALS WERE CLASSIFIED

The following definitions of positive and negative appeals are presented because existing material on the subject concerns

[1] Poffenberger, Psychology in Advertising, p. 579.

several essentially different problems. A positive appeal is intended to stimulate the reader to the attainment of something desirable. In contrast, a negative appeal strives to lead the reader away from an annoying situation. This interpretation is in agreement with Poffenberger, who says, " . . . . the negative appeal to 'avoid fatigue.' This is essentially a negative appeal."[2] Avoidance is the basis of negative appeal in advertising.

It should be noted that only a limited percentage of all advertisements fall distinctly into either the positive or negative type of appeal. Many advertisements are sufficiently long to carry both positive and negative. In others the appeal may

(*Courtesy of Colgate & Co.*)

FIG. 1. A POSITIVE APPEAL (CAR CARD) ADVERTISEMENT

be mixed or so general as to belong to neither type. For that reason the data are confined to those outstanding specimens of each type which are most apt to illustrate the relative advantages in question. Figure 1 is an excellent example of positive appeal advertising. The words, "beauty," "sparkles," "clean" and "dazzlingly white" combine in an effort to stimulate the reader to attain those qualities. Figures 2 and 3 represent the use of both positive and negative appeals in different advertise-

[2] Poffenberger, Psychology in Advertising, p. 579.

ments of the same product. The two illustrations show a clear contrast in human facial expressions. There is a wide

Admired everywhere
the radiant smiles that show
The MOUTH of YOUTH
These six little mouth glands are most active in youth
TO six little glands in your mouth you owe your shining teeth, your healthy pink gums and pure breath.
They produce the fluids necessary to guard your whole mouth from dangerous food acids.
But from your earliest years, soft, modern foods slow up your mouth glands. They lack the exercise of hard chewing. Gradually they lose their vigor. Then decay begins, gums suffer.
That is why in Pebeco the formula was worked out especially to restore the normal action of the mouth glands. Pebeco Tooth Paste not only polishes your teeth beautifully but keeps the mouth glands active as in youth.
The important salty taste
FOR Pebeco contains a certain important ingredient which you can taste as you brush your teeth. Instantly your whole mouth is cleansed, refreshed by Pebeco's sharp, clean tang. And the tingling after-feeling tells you that Pebeco has awakened the tiny mouth glands to youthful vigor.
How happy and confident you are when your smiles are attractive
No matter how close to other people you laugh and speak, you know your breath is always fresh and sweet as a child's. With Pebeco, your smiles can always be bright and gay.
"I like the taste of Pebeco," says everyone who uses it regularly. "The keen, sharp tang leaves the mouth feeling cool and sweet."
You can taste
Free Offer
PEBECO
keeps the Mouth Glands Young

(*Courtesy of Lehn & Fink*)

FIG. 2. A POSITIVE APPEAL ADVERTISEMENT

gulf between the "radiant smiles" of the "Mouth of Youth" in figure 2, and the situation in which "I had six teeth pulled

this morning" as the result of "acid mouth." The samples reproduced here are extreme illustrations of the two types of

"I had six teeth pulled this morning"
SIX precious teeth he has lost forever! Six teeth that would still be in his gums—firm, white teeth, good to look at—had he taken proper care of them.
Don't let your teeth go that way. Don't ignore the fact that decay begins long before you feel a twinge of pain or see any evidence of your teeth being destroyed.
"Acid-Mouth," a condition that causes teeth to decay rapidly, is eating away at your teeth night and day. One by one they will decay—and some day you also may be saying, "I had six teeth pulled this morning"—unless you start at once to check "Acid-Mouth."
Begin using Pebeco today. Pebeco is the tooth paste that counteracts "Acid-Mouth" by stimulating the flow of normal alkaline saliva, which is nature's own wash for teeth, mouth, and gums, and the most effective means of neutralizing mouth acids.
You'll like Pebeco, for in addition to checking acidity, Pebeco keeps the teeth clean and firm, and gives to the mouth a gratifying sense of cleanliness.
To the last squeeze, Pebeco rolls out creamy.
LEHN & FINK, Inc.
Ask your Druggist for the Pebeco Tooth Brush
It cleans every part of every tooth
How to tell if you have "Acid-Mouth"
PEBECO
TOOTH PASTE

(Courtesy of Lehn & Fink)

FIG. 3. A NEGATIVE APPEAL ADVERTISEMENT

(The product is the same as in figure 2)

appeals. The great bulk of present day advertisements range in between these unusually prominent specimens.

All of the advertisements compared in this study were selected by one individual. In order to insure the accuracy of the classification into positive and negative types it was desirable to compare the individual judgment with that of a group. Thirty of the advertisements which had been chosen to represent both types were submitted to a group of thirteen disinterested individuals for classification. The results of this check showed an agreement in 96.67 per cent of the cases. This indicates that there should be no serious error in having the remaining advertisements selected by one person, in conformity with the definitions as stated above. Space is lacking for the presentation of all of the results of this check test.

WHY COUPON RESULTS WERE USED FOR COMPARISON

A comparison of the practical effectiveness of positive and negative advertising appeals was found to be most readily made on the basis of coupons returned. Progressive advertisers keep elaborate records of the number of inquiries each coupon bearing advertisement brings from its readers. In some cases where there are variations in the cost of the advertisements the cost per inquiry is used as the measure of the effectiveness of the appeal. Many companies generously made their records available for the purposes of this study. All of the data were secured directly from the records in person except in one instance which is so marked. The manufacturer, the advertising agency and the publisher of each advertisement are concerned with the results obtained. For that reason it was usually requested that the data be held confidentially and the names of manufacturers, advertisers and publishers are withheld.[3]

Actual sales constitute the ultimate goal of any commercial advertisement. Just how accurate a measure of effectiveness is afforded by coupons has frequently been questioned. Recently Starch compared coupon returns with actual sales and found a close relationship. As a result he states that, " . . . . inquiries serve as a good measure of the sales value

[3] These names may be obtained from D. B. Lucas upon request, and with the consent of the proper parties.

of advertisements."[4] Poffenberger reports that, "In investigating current methods of measuring advertising efficiency the writer was surprised to discover the reliance which is at present placed upon the return coupon as a measure of the value not only of a particular piece of advertising copy, but of an advertising medium which carries the copy."[5] While the coupon results are not an actual measure of sales effectiveness they are accepted and used as a valuable guide. This combined with the relative ease of obtaining results in terms of coupons has led to their use in this study. Coupons when marked or "keyed" can be definitely credited to the proper advertisement but retail sales are difficult to trace to any specific appeal.

THE SOURCES OF THE DATA

A narrow range of products or goods was found to be advertised in a way suitable for this study. Confinement of comparisons to advertisements bearing keyed coupons, and representing both positive and negative appeals in the sale of the same goods, was responsible for this limitation. The advertisements which were finally selected represented several brands of tooth paste, a food drink, a breakfast cereal and two products sold for purposes of sanitation. These comparisons have been supplemented by advertisements of institutions which sell extension educational courses. Every trade name included is associated with well known and widely advertised products. The comparisons of coupons returned were restricted to advertisements covering at least one-fourth page in the magazine and returning one hundred coupons or more.

Advertisements were selected from a large number of popular American magazines, but several offered much more suitable material than others. *The Literary Digest*, *The Ladies' Home Journal* and *Good Housekeeping* were found to be very fruitful sources of data. Some of the comparisons for educational courses were taken from the magazine section of a Sunday

[4] Starch, An Analysis of Over 3,000,000 Inquiries (1927), p. 6.
[5] Poffenberger, Psychology in Advertising, p. 12.

newspaper. The following list includes the mediums which carried most of the advertisements that were compared:

1. American Magazine, The
2. Collier's Weekly
3. Cosmopolitan
4. Good Housekeeping
5. Ladies' Home Journal, The
6. Liberty
7. Literary Digest, The
8. McCall's Magazine
9. Physical Culture
10. Red Book, The
11. Saturday Evening Post, The
12. Woman's Home Companion, The

One hundred and seventeen pairs of advertisements, representing 233 different pieces of copy, were used in determining the relative values of positive and negative appeals. For each comparison two advertisements of the same product were taken from the same periodical, and were published at about the same time or season. Both members of each pair were alike in size and the use of illustrations, color, headlines and text. Care was exercised to have both advertisements in equally favorable positions in the magazines. Monthly magazines from which much of the data were obtained, frequently run advertisements for the same product in several successive issues and on the same page number or reasonably close. The size of advertisements and the use of illustrations, color, headlines and text were found to remain nearly constant throughout advertising campaigns lasting several years. Where such positive and negative advertisements were used, it was possible to keep constant many of those factors which influence advertising effectiveness.

THE METHOD OF MAKING COMPARISONS

In comparing advertisements the numbers of coupons returned for both the positive and negative advertisements were recorded on one line, as shown in table 1. A comparative score was then computed by determining the per cent that the nega-

tive return is of the positive return. The value of the positive advertisement is 100 per cent. If the value of the negative advertisement falls below 100 it indicates that the comparison favors the positive appeal. If it exceeds 100 the comparison shows the negative to advantage.

Separate columns show the relative values as computed for numbers of coupons returned and costs per coupon. It is obvious that the lower the cost per coupon returned the more efficient the advertisement. It is better to get coupons returned at 50 cents each than one dollar each. In order to make the relative values based on costs per coupon comparable with the values for numbers of coupons returned, it would be necessary to first compute the number of coupons returned per dollar invested. Thus, 50 cents per coupon is equivalent to two coupons per dollar. The same relative value was obtained more directly from the costs per coupon by using the cost per positive coupon as the numerator in computing per cents. That gives the same meaning to both columns of relative values. Relative values based on numbers of coupons should be the same as those for coupon costs where all factors except the appeals are the same. In some instances the values differ where both are given. This is probably due to variations in the cost of the same advertising space for different issues of the same magazine. In the cases where only the values based on costs per coupon are given a further explanation is necessary. The coupon offer was not kept constant for all seven of the comparisons representing products sold for purposes of sanitation. In the case of educational data the figures on costs per inquiry are average costs for the same piece of copy used in several mediums. For that reason these data may have more weight than those for manufactured products, since figures on the latter are for only one insertion of the advertisement.

A GENERAL COMPARISON BASED ON NUMBERS OF INQUIRIES AND COSTS PER INQUIRY

Table 1 shows a summary of the 117 comparisons, all of which were based directly on coupons. The advertisements are

TABLE 1

Combined grouping of comparisons of coupon returns for positive and negative appeals in advertising

NUMBER	KIND OF GOODS	COUPONS RETURNED FOR ADVERTISEMENT		RELATIVE PER CENT N/P	COST PER COUPON RETURNED		RELATIVE PER CENT P/N	REMARKS
		Positive	Negative		Positive	Negative		
1	Tooth paste	13,653	9,257	68				Headlines compared, illustrations all positive
2		10,332	7,253	70				
3		6,726	7,868	117				
4		9,687	8,822	91				
5		8,920	11,345	127				
6	Tooth paste	7,240	6,160	85				Compares headlines and text
7		5,182	4,452	86				
8		4,632	3,724	80				
9		1,409	1,322	94				
10		1,500	1,352	90				
11		615	602	98				
12		4,207	2,740	65				
13		1,974	3,080	156				
14		829	829	Equal*				
15		812	721	89				
16		3,566	4,303	121				
17		3,650	2,875	79				
18		3,153	3,335	106				
19		2,183	4,154	190				
20		1,960	1,246	64				

21		1,822	1,543	85				
22		986	1,374	139				
23		1,457	1,535	105				
24		800	1,277	160				
25	Tooth paste	(Numbers of coupons were converted to relative basis by advertiser and sent by mail)		78				Greatest difference was in headlines
26				87				
27				108				
28				113				
29				102				
30				102				
31				95				

Summary for tooth paste advertisements

Number favoring positive appeal..... 17
Number favoring negative appeal..... 13
Number having equal results..... 1

32	A food drink	2,800	1,458	52	$4.28	$8.23	52	Comparing entire advertisements
33		1,541	1,691	110	7.79	7.09	110	
34		3,925	2,469	63	3.06	4.86	63	
35		2,282	2,283	Equal	5.26	5.25	Equal	
36		859	948	110	3.95	2.40	165	
37		824	693	84	2.77	3.29	84	
38		1,387	972	70	2.45	3.60	68	

* Relative values are assumed to be equal when they fall between 99.5 per cent and 100.4 per cent.

TABLE 1—*Continued*

NUMBER	KIND OF GOODS	COUPONS RETURNED FOR ADVERTISEMENT		RELATIVE PER CENT N/P	COST PER COUPON RETURNED		RELATIVE PER CENT P/N	REMARKS
		Positive	Negative		Positive	Negative		
39		1,679	1,263	75	$2.26	$3.01	75	
40		1,738	1,457	84	2.44	2.91	84	
41		880	1,312	149	4.83	3.24	149	
42		862	759	88	3.65	3.82	96	
43		818	589	72	3.85	5.35	72	
44		579	382	66	3.11	4.71	66	
45		367	363	99	4.90	4.96	99	
46		629	573	91	3.18	3.49	91	
47		413	447	108	4.84	4.47	108	
48		1,217	1,598	131	3.12	2.38	131	
49		322	276	86	3.72	4.35	86	
50		153	212	139	7.84	5.66	139	
51		1,094	800	73	7.77	10.62	73	
52		594	1,377	232	14.31	6.17	232	
53		161	181	112	4.65	3.45	135	
54		206	144	70	3.64	5.21	70	
55		775	1,744	225	4.38	1.95	225	
56		1,258	1,353	108	2.70	2.51	108	
57		289	344	119	3.11	2.61	119	
58		206	220	107	7.28	6.82	107	
59		393	370	94	6.87	7.29	94	
60		1,196	1,744	146	2.84	1.95	146	
61		312	181	58	2.00	3.45	58	
62		646	619	96	4.18	4.36	96	

63		962	1,377	143	8.83	6.17	143	
64		192	351	183	3.44	1.88	183	Children's magazines
65		541	493	91	1.48	1.62	91	
66		117	385	329	5.64	1.71	330	
67		280	266	95	.53	.56	95	
68		100	134	134	1.35	1.02	132	

Summary for food drink advertisements:

Number favoring positive appeal..... 19
Number favoring negative appeal..... 17
Number having equal results..... 1

69	Breakfast food	6,187	4,223	68	$1.94	$2.84	68	Comparing entire advertisements
70		4,562	6,941	152	2.63	1.73	152	
71		4,503	5,085	113	2.22	1.96	113	
72		1,455	1,499	103	2.34	2.32	101	
73		1,820	2,039	112	1.87	1.66	113	
74		1,056	1,081	102	1.70	1.66	102	
75		3,712	5,539	149	2.83	1.89	150	
76		2,543	4,012	158	3.62	2.29	158	
77		4,386	4,848	111	2.73	2.48	110	
78		2,583	2,326	90	1.93	2.15	90	
79		367	334	91	2.04	2.24	91	
80		504	578	115	2.97	2.59	115	
81		2,067	1,253	61	4.11	6.78	61	

Summary for breakfast food advertisements:

Number favoring positive appeal..... 4
Number favoring negative appeal..... 9

TABLE 1—*Continued*

NUMBER	KIND OF GOODS	COUPONS RETURNED FOR ADVERTISEMENT		RELATIVE PER CENT N/P	COST PER COUPON RETURNED		RELATIVE PER CENT P/N	REMARKS
		Positive	Negative		Positive	Negative		
82	Sanitation articles	1,276	1,797	141				Comparing entire advertisements
83					$113.00	$60.00	188	
84					113.00	72.56	156	
85					66.00	62.68	105	
86					64.42	74.76	86	
87					65.59	90.32	73	
88					33.00	70.64	47	

Summary of advertisements for sanitation articles:

Number favoring positive appeal	3
Number favoring negative appeal	4

Total summary for manufactured articles:

Number favoring positive appeal	43
Number favoring negative appeal	43
Number having equal results	2
Total	88

89	Educational	1,021	368	36				Comparing entire advertisements
90	courses	254	325	128				
91	from 89 to	81	77	95				
92	117	82	58	71				
93					$1.11	$0.93	120	
94					1.27	1.27	Equal	
95					1.41	1.39	101	
96					1.01	1.57	64	
97					.83	.51	163	The illustrations were not distinctly different
98					1.40	.47	298	
99					1.15	.73	158	
100					.44	.84	52	
101					.74	.79	94	
102					.79	.76	104	
103					1.00	1.08	93	
104					.64	.67	96	
105					1.11	.30	370	
106					1.25	.84	149	
107					.51	.72	71	
108					1.79	.66	271	
109					.61	.83	73	
110					2.01	1.06	190	
111					2.33	.73	319	
112					.86	1.20	72	
113					1.11	1.45	77	

TABLE 1—*Concluded*

NUMBER	KIND OF GOODS	COUPONS RETURNED FOR ADVERTISEMENT		RELATIVE PER CENT N/P	COST PER COUPON RETURNED		RELATIVE PER CENT P/N	REMARKS
		Positive	Negative		Positive	Negative		
114					$1.27	$ .92	138	
115					.84	1.30	65	
116		417	384	92	1.75	1.91	92	Compare whole ad-
117		340	370	109	1.65	1.51	109	vertisements

Summary of advertisements for educational courses:

Number favoring positive appeal	14
Number favoring negative appeal	14
Number having equal results	1

Complete summary of table 1

Number favoring positive appeal	57
Number favoring negative appeal	57
Number having equal results	3
Total	117

numbered, followed by columns indicating the kind of goods and the coupons returned for each member of the pairs. The next column gives the per cent that the number of returns for the negative is of the returns for the positive. Then follow, where known, the costs per coupon with the corresponding relative values in the last column of figures. All of the coupon returns for manufactured products are from advertisements which have appeared since 1920.

METHOD OF SUMMARIZING TABLE 1

The number of comparisons favoring positive advertising appeals was found by totaling the number of relative per cents having but two digits. The negative total includes those per cents having three digits. Numerical values between 99.5 and 100.4 were assumed to be equal. All per cents were listed in whole numbers because the range was so great that tenths of 1 per cent would not have affected the summarized comparisons.

Inspection of those comparisons in the table where both numbers of coupons and costs per coupon were used, reveals that either relative per cent favors the same type of appeal. The relative values are the same in most cases where given twice, there being but 9 exceptions. This led to the indiscriminate use of per cents based on numbers of coupons and costs per coupon, on the assumption that the relative standings of the advertisements would not be affected. Such differences as do exist would seem to favor each type of appeal equally where both per cents are given. They may be attributed to variations in cost of the advertising space, variations in the coupon offer, and variations in the expense connected with answering the inquiry.

IMMEDIATE CONCLUSIONS FROM TABLE 1

The summary of table 1 indicates conclusively that there is no outstanding tendency favoring either positive or negative types of appeals in the data presented. The same is true whether data for manufactured articles and educational courses are considered independently or collectively. It is probably a

coincidence that the totals for the per cents above and below 100 are exactly the same. This is precisely in accord with the law of averages on the assumption that positive and negative appeals do not differ in the effectiveness with which they may be used in advertising the goods listed. The results suggest that, in general, the way the appeal is used is more important than the type of appeal.

The summarized comparisons for the individual kinds of goods in table 1 are as follows:

KIND OF GOODS	COMPARISONS FAVORING POSITIVE APPEALS	COMPARISONS FAVORING NEGATIVE APPEALS	EQUAL COMPARISONS	TOTALS
Tooth paste	17	13	1	31
A food drink	19	17	1	37
A breakfast food	4	9	0	13
Sanitation articles	3	4	0	7
Total for manufactured products	43	43	2	88
Educational courses	14	14	1	29
Total	57	57	3	117

Figure 4 is a graphical representation of the summary of table 1. There does not seem to be enough difference between the positive and negative advertisements for any of these goods to justify the recommendation of either type exclusively. In the case of breakfast food the comparison stands 9 to 4 in favor of negative appeals, but these data are hardly sufficient to more than suggest the superiority of the negative. Such a difference does indicate the desirability of analyzing the appeals suitable for every kind of goods, each as a separate and specialized study.

FURTHER INTERPRETATION OF TABLE 1

It may be well to repeat here that in every comparison the positive advertisement had the arbitrarily assigned value of 100 per cent. If the relative value happens to be 50 per cent for the negative advertisement it is evident that the positive

is twice as effective. However, the relative value for the negative advertisement must be 200 per cent before it has twice the value of the positive. This makes it apparent that variations below 100 per cent cannot be compared directly with variations above 100. The relative values for the negative

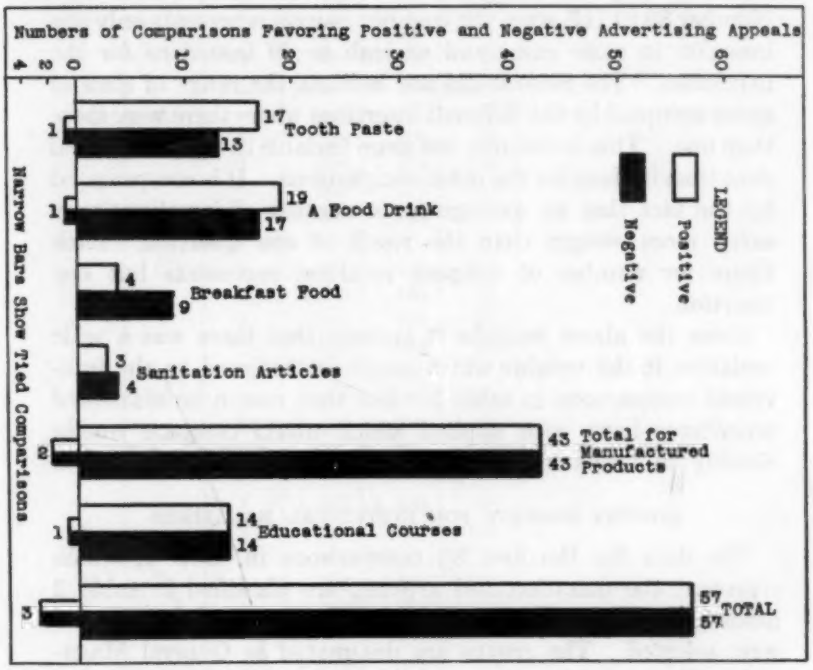

FIG. 4. GRAPHICAL SUMMARY OF THE COMPARISONS OF COUPON RETURNS FOR POSITIVE AND NEGATIVE ADVERTISEMENTS

advertisements range from 36 per cent for Number 89 to 370 per cent for Number 105. This indicates that the negative advertisements range in value from about one-third of the effectiveness of the positive up to more than three times the positive.

The number of coupons returned ranges from 100 for the positive advertisement in Number 68 to 13,653 for the positive

advertisement in Number 1. The size of the advertisements ranges from one-fourth of a magazine page to full page size, in the case of manufactured products. The figures for these products, which include the first 88 comparisons, represent but one insertion for each advertisement. There is less uniformity in the data on educational courses, in the comparisons from Number 89 to 117, since the cost per coupon represents only one insertion in some cases and as high as 69 insertions for the maximum. The records did not indicate the range of sizes of space occupied by the different insertions where there were more than one. This introduces one more variable in the educational data than in those for the other comparisons. It is compensated by the fact that an average for a number of insertions may carry more weight than the result of one insertion. Each figure for number of coupons returned represents but one insertion.

From the above remarks it appears that there was a wide variation in the weights which might be assigned to the individual comparisons in table 1. For that reason no statistical procedures have been applied which would compare results directly in terms of coupons returned or costs per coupon.

COUPON RESULTS FOR INDIVIDUAL MAGAZINES

The data for the first 88 comparisons in table 1, which represent the manufactured articles, are classified in table 2 according to the magazines from which the advertisements were selected. The groups are designated as General Magazines, Women's Magazines and Children's Magazines. Index letters are used instead of the names of the magazines in order to conceal their identity. The purpose of this revised classification is to determine whether there is any variation in the effectiveness with which positive and negative appeals are used in the respective groups. The sizes of the advertisements are given in table 2 in fractions of a page since the page size remains uniform for the same periodical. The range in numbers of coupons returned for the same size of advertisement, for the same product, in the same periodical, will then be evident.

TABLE 2

Comparisons of coupons returned for positive and negative appeals in advertising listed for each magazine

NUMBER	MAGAZINE	SIZE IN PAGES	COUPONS RETURNED FOR ADVERTISEMENT		RELATIVE PER CENT N/P	REMARKS
			Positive	Negative		
17	A	½	3,650	2,875	79	A general magazine
55		⅔	775	1,744	225	
56		⅔	1,258	1,353	108	
60		⅔	1,196	1,744	146	
78		1	2,583	2,326	90	
51	B	1	1,094	800	73	
52		1	594	1,377	232	
63		1	962	1,377	143	
81		1	2,067	1,253	61	
53	C	1	161	181	112	
54		1	206	144	70	
61		1	312	181	58	
79		1	367	334	91	
15	D	½	812	721	89	
23		1	1,457	1,535	105	
24		1	800	1,277	160	
21	E	1	1,822	1,543	85	
22		1	986	1,374	139	
58	F	½	206	220	107	
80		½	504	578	115	
59	G	⅔	393	370	94	
62		⅔	646	619	96	
44	H	½	579	382	66	
45		½	367	363	99	
57	I	½	289	344	119	
14	J	½	829	829	Equal	

Summary for general magazine advertisements:

Number favoring positive appeal	13
Number favoring negative appeal	12
Number having equal results	1
Total	26

TABLE 2—*Continued*

NUMBER	MAGAZINE	SIZE IN PAGES	COUPONS RETURNED FOR ADVERTISEMENT		RELATIVE PER CENT N/P	REMARKS
			Positive	Negative		
1	K	1	13,653	9,257	68	A women's magazine
2		1	10,332	7,253	70	
3		½	6,726	7,868	117	
4		1	9,687	8,822	91	
5		1	8,920	11,345	127	
6		1	7,240	6,160	85	
7		1	5,182	4,452	86	
8		½	4,632	3,724	80	
25		½			78	Figures for nos. 25 to 31
26		1			87	were obtained by mail
27		½			108	and were already
28		½			113	computed on relative
29		1			102	basis
30		½			102	
31		½			95	
32		1	2,800	1,458	52	
33		1	1,541	1,691	110	
34		1	3,925	2,469	63	
35		1	2,282	2,283	Equal	
69		1	6,187	4,223	68	
70		1	4,562	6,941	152	
82		1	1,276	1,797	141	
83					188	The values from nos. 83
84					156	to 88 are based on
85					105	costs per coupon re-
86					86	turned
87					73	
88					47	
20	L	1	1,960	1,246	64	
36		1	859	948	110	
37		¾	824	693	84	
38		1	1,387	972	70	
72		1	1,455	1,499	103	
73		1	1,820	2,039	112	
74		½	1,056	1,081	102	
9	M	¼	1,409	1,322	94	
18		1	3,153	3,335	106	
19		1	2,183	4,154	190	
39		½	1,679	1,263	75	
71		1	4,503	5,085	113	

TABLE 2—*Concluded*

NUMBER	MAGAZINE	SIZE IN PAGES	COUPONS RETURNED FOR ADVERTISEMENT		RELATIVE PER CENT N/P	REMARKS
			Positive	Negative		
10	N	¼	1,500	1,352	90	
11		¼	615	602	98	
42		½	862	759	88	
43		½	818	589	72	
76		1	2,543	4,012	158	
12	O	¼	4,207	2,740	65	
16		¼	3,566	4,303	121	
40		½	1,738	1,457	84	
41		½	880	1,312	149	
77		1	4,386	4,848	111	
13	P	¼	1,974	3,080	156	
48		½	1,217	1,598	131	
75		1	3,712	5,539	149	
46	Q	½	629	573	91	
47		½	413	447	108	
49	R	½	322	276	86	
50		½	153	212	139	

Summary for women's magazine advertisements:

Number favoring positive appeal	28
Number favoring negative appeal	28
Number having equal results	1
Total	57

64	S	⅛	192	351	183	Children's magazines
66		½	117	385	329	
65	T	½	541	493	91	
67	U	½	280	266	95	
68	V	½	100	134	134	

Summary for children's magazine advertisements:

Number favoring positive appeal	2
Number favoring negative appeal	3

Complete summary of table 2

Number favoring positive appeal	43
Number favoring negative appeal	43
Number having equal results	2
Total	88

METHOD OF SUMMARIZING TABLE 2

The summaries in table 2 were obtained in the same way as those in table 1. Each class of magazines is followed by a summary and a general summary for the entire table is given at the end.

IMMEDIATE CONCLUSIONS FROM TABLE 2

The figures shown in the summary for the general magazines give no evidence of any distinct preference between positive and negative appeals in advertising to the general American magazine reading public. There is even less evidence of any preference between positive and negative appeals in selling to American women. Since these groups represent adult readers it would seem, by elimination, that there is no preference between these two types of appeals for men readers. The few comparisons made for children's magazines stand 3 to 2 in favor of negative appeals, but do not seem to justify definite conclusions.

By inspection of table 2 it is possible to observe the wide range in effectiveness between different advertisements of the same type, size and periodical. Referring to table 1 the same comparisons can be made for the same product since the serial numbers remain the same. For example, it appears that the coupons returned for positive advertisements of the same tooth paste with full page spaces in magazine K range from 8,920 to 13,653. In a similar way the negative results for a food drink range from 1,458 to 2,469. Since the positive and negative appeals have shown such uniformity in effectiveness, as indicated by the summaries for tables 1 and 2, it appears that variations within either positive or negative appeals are far more important than differences between the two types.

EXISTING OPINIONS ON THE PRESENT QUESTION

It may be well at this point to introduce some of the existing opinions on the relative values of positive and negative appeals. A few quotations from academic authorities will indicate their

attitude toward the use of negative appeals in advertising. Kitson points out in a comprehensive discussion that, "In applying the laws of suggestion to advertising and selling, psychologists have recommended the abandonment of negative and the use of positive suggestions."[6] He produces historical data from which he concludes that, "These results . . . . give basis for condemning the use of negative suggestions all apart from theoretical grounds." Scott apparently alludes to the same thing when he says, "The depiction of the darker sides of life may be very effective, but the depiction of the rosier hues is more attractive to most people."[7] He gives evidence that he considers the question to be open when he says, "Whether the dark or the bright side of life offers the most material for the advertiser may be questionable, ... "[8] In concluding this part of the discussion Scott remarks, "I believe that most persons would choose the magazine advertisements that present only the more cheerful aspects of life."[9] Further analysis of the writings of theorists seems to bear out the remark of Kitson that psychologists have recommended the abandonment of negative.

Directly in opposition to many of the academic and theoretical experts are the practical advertisers. In an article entitled "Wet Rubber Slips," published in *Advertising and Selling*, Mr. Frank Hough says, "But scare copy (negative appeal) is like any other copy; it can be good or bad . . . . "[10] A suggestive subtitle for the article reads, "The American Chain Company Proves that Safety can be Sold Only by Negative Appeal Advertising." He shows his disbelief in existing theories in the remark that, "Wet Rubber Slips and will continue to slip, psychological theories notwithstanding." The merits of negative appeals are discussed in *Tide*, concluding as follows: "Impartial observers feel that affirmative (positive)

[6] Kitson, Scientific Advertising, p. 58.
[7] Scott, The Psychology of Advertising, p. 144 (Dodd, Mead & Co.).
[8] Scott, The Psychology of Advertising, p. 147.
[9] Scott, The Psychology of Advertising, p. 148.
[10] Advertising and Selling, December 1, 1926, p. 23.

advertising, skillfully handled, produces results; that negative advertising, skillfully handled, produces results . . . . that the 'how' is more important than the 'what.' "[11] The recognition of the value of negative appeals by advertisers is further substantiated by remarks contributed to this study through personal interviews and letters to the effect that, "Our results are not at all conclusive, in fact, they show that both types (positive and negative appeals) can be used to good advantage, provided they are handled properly," and that, "The whole business of proprietary medicines has been built upon the negative appeal." The preceding statements can leave little doubt as to the existence of a controversy over the relative merits of positive and negative types of appeals.

It would seem that there is a wide difference of opinion between psychologists and practical advertisers. There has been a conspicuous lack of data accompanying the assertions for and against both positive and negative appeals. Inquiry among writers of the foremost texts on the psychology of advertising reveals no data bearing directly on the question, with the exception of those published by Kitson as mentioned above. The following significant statement is quoted from one reply, "I do not know that anyone has ever made a scientific investigation concerning the relative values of positive and negative appeals in general. Practically every book on advertising touches upon the subject and most of the writers favor the positive appeal." The statement shows at once the popular attitude on the question and the lack of scientific data. Few have sought out any facts but many are willing to venture opinions. Just how true this is with the practical advertisers can be questioned since the elaborate records of some concerns may have helped them to form conclusions with reference to their own products. The wide variations in the practices adopted for selling the same kinds of goods indicate that if there is any advantage for either type of appeal it is not generally recognized.

[11] Tide (published by Time Inc., New York City), April, 1927, p. 3.

SUMMARY OF CONCLUSIONS FROM THE STUDY OF COUPON RETURNS

The following conclusions, based on coupon returns for positive and negative advertisements, seem to be evident from the results:

1. That there is no inherent advantage favoring positive appeals as compared with negative appeals in advertising those products which are now using both types.

2. That it would be desirable to determine the kinds of appeals which are most effective for each class of goods or product individually.

3. That adults, both men and women, do not seem to indicate any stronger reaction to positive coupon bearing advertisements than to the negative type.

4. That the variations within positive or negative types of appeals are far more important than the differences between the types.

These conclusions are in harmony with or do not contradict the following statements made in interviews or included in correspondence with commercial advertisers:

" . . . . our results . . . . show that both types (positive and negative appeals) can be used to good advantage, provided they are handled properly."

"In our analyses . . . . , we have found that the positive appeal produces greater results and makes a better impression on the reading public, as a whole, than the negative appeal."

"The whole business of proprietary medicines has been built upon the negative appeal."

The first of these three quotations is from an advertiser who uses both positive and negative advertising. The second and third quotations come from advertising concerns which have tried both and finally concluded to use one type or the other rather exclusively for their products. This further emphasizes the need for separate studies of the appeals most effective for individual products, rather than the wholesale elimination of either positive or negative appeals from advertising.

The results of the study of coupon returns seem to bear out

the opinion of impartial observers as expressed by the statement taken from *Tide* that, "Impartial observers feel that affirmative (positive) advertising, skillfully handled, produces results; that negative advertising, skillfully handled, produces results . . . . that the 'how' is more important than the 'what.' "[12]

[12] Tide, April, 1927, p. 3.

IMPROVEMENT OF FEEBLE-MINDED GIRLS OVER 16 YEARS OF AGE

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Among the occupations suggested for entertaining the feeble-minded it is not the common opinion that reading may be profitably used, but an experiment recently tried in the Belchertown State School shows that quite remarkable results may be obtained.

A reading club was organized in this Institution in March, 1926, called The Bluebird Reading Circle. Only ten girls were found at first who were interested, but a little later the membership rose to twenty. The average membership from January, 1927, to October, 1928, was 22. The girls were mostly high-grade or borderline cases, but sometimes girls of lower mentality were found who liked to read. The range of life ages was 17 to 49, though only one case was over 36, the median age being 24. The range of mental ages was 8 years 7 months to 13 years 8 months; the median being 11 years. The range of IQ was .53 to .85; the median .68.

The librarian of the town library was found ready to co-operate with the work of the club. The system arranged by the State Department of Public Libraries was found ready to hand. This system was designed to encourage the reading of good books by the school children of the State. A list of books is prepared, some story books, some non-fiction, grouped according to difficulty, labelled by grades IV, V, VI, VII, VIII. When a book has been read the child records it on a blank prepared for that purpose, writes down the name and author of the book, important characters, and also what he or she likes

best in the book. The blank provides for recording five books. When completed, it is returned to the librarian and the child receives in return a certificate signed by the librarian. The names of the books read are recorded on the back of the certificate. When a child has obtained four such certificates indicating that he has read twenty books he receives an honor certificate. This honor certificate is larger, 6 by 8 inches. has a blue seal, and on the back is recorded the names of five non-fiction books that the child must read in order to earn this mark of distinction.

The privilege of securing these certificates was accorded to the members of the Bluebird Reading Circle by the librarian of the town library. It was felt that something more than the library requirements for certificates would be desirable for the State School girls, so in addition to filling out the blank preliminary to obtaining the certificate, each girl was required to write a story or report of the book read. This report was intended to be a summary of the contents of the book, the story in the girl's own words as far as possible. In case the girl could not do this, she was told to take each chapter and write a few lines about it. In some cases when the girl could not frame sentences of her own she was allowed to take some sentences from the book that would tell what it was about, but she was encouraged as much as possible to make the report in her own words. About four pages of writing was the usual length of the report.

As the work went on the girls showed improvement in writing and in ability to express in words what they had read. A study of the types of the reports has been made and of the improvement in individual cases.

The types of reports are as follows:

A. Words of book used. Sentences connected irrelevantly.
B. Words of book by chapters.
C. Girl's own language used.
  a. Too much detail at beginning. Story not finished.
  b. Much detail. Important parts not told. Just one event after another.
  c. Important parts given. Concrete.
    1. Running notes.

2. Connected story.
3. Interpretation.

Examples of these types are given, not always in full, but enough is given to show the language used.

A. WORDS OF BOOK CONNECTED IRRELEVANTLY

WHAT KATY DID BY SUSAN COOLIDGE

I was Sitting in the meadows one day not. vy long ago where small frols The place to which the children were going was a sort of marshy thicket at the bottom a field Mrs. Haight School to which Katy and Clover and Cecy went—Stood quiet at the other end of the town But I am sorry to say that my poor thoughtless Katy did forget and get into another scrape and that no later than the vy Monday. (and so on.)

B. WORDS OF BOOK BY CHAPTERS

MARY OF PLYMOUTH BY JAMES OTIS

Chapter 1. Why this story was written, My name is Mary, and I am setting down all these things about our people here in this new world, hoping some day to send to my dear friend Hannah, who lives in Sesorby, England, what may really come to be a story. Chapter 2. Searching for a home. Father was wet, cold, weary, and almost discouraged when he came on board the vessel after that first day on shore. The man had found no place which looked as if it might be a good spot for our village. (and so on.)

In this report something was said about every chapter in the book. Here it is possible to give enough merely to show the type.

C. GIRL'S OWN LANGUAGE USED

a. Too much detail at beginning. Story not finished

NELLY'S SILVER MINE BY HELEN HUNT JACKSON

It was Christmas morning and Nelly and Rob was in bed their mother would not let them up as the house was cold and Nelly and Rob were twins Rob was sick in bed with a sore throat They had a cook and her name was Sarah, Mrs. March is a English woman and she had lived in England untill she was married The children were twelve years old, The children put things in their Grandfather stocking One stocking was white and one was gray The children Grandfather was a queerest

old gentleman that ever known He lived a great many miles from the village where the children lived, He never ate butter he allway used Olive all over everything Mrs. March went to see what was keeping the cook Sarah the cook was asleep and Mrs. Marsh thought she was drunk.

This goes on to the extent of seven written pages, then stops abruptly, the story not finished.

b. Much detail. One event after another

THE BLAZED TRAIL BY STEWARD EDWARD WHITE

This is the story of the time of the Pioneers when they wore buckskin, mackinaw, and etc. The men of those days were very strong and a frank clearness of the eye. In Michigan, which was known as the Saginaw waters, the firm of Morrison and Daly for many years did logging operations of pine logs in the spring. Mr. Daly had some great mills at Beeson Lake; he thought that by another winter they would have the woods all cut down and all of the logs brought in. So Mr. Daly and Mr. John Radway come, and he asked him if he would take the job of getting the wood cut on the Cass Branch, they owned five million.

This report goes on to the extent of 24 written pages in the same style without emphasis on important parts or giving an outline of the story. It is fairly well written and punctuated.

c. 1. Running notes

UNDERSTOOD BETSY BY DOROTHY CANFIELD

Chapter 1. Elizabeth Ann lived on a Small Estate with her Great Aunt Harriet and Frances—Grace. She wasn't very poor. Neither very rich But enough to get along on. She keep Grace. She had a terrible cough that was heard all around So Aunt Harriet took pity on her, No one else could stand by Elizabeth Ann Mother and Father died when she was a mere child. So her Aunt Harriet took her. (About one page of this type is written on the first chapter.)

Chapter 2. Elizabeth arrives Hillsboro Vermont. It was a very bleak country. Very cold for a little girl. Didn't think she could stand it Uncle Harry meets her at the station drives her home Very quiet has much to say to her She arrives safely two ladies come to meet her. Very nice to her But not like her Auntie Harriet Aunt Abigail gives her a small kitten to amuse herself. This new home seems strange to far different than the one she came from.

In this report each chapter is commented on, but without much regard to framing of sentences. Merely enough is here given to show the type.

c. 2. Connected story

MOTHER CAREY'S CHICKENS BY KATE DOUGLAS WIGGIN

This story is called Mother Carey's chickens. This mother just had five children, there father died. Mrs. Carey had received a call to come and take care of him. He died while she was taking care of him. There is two girls and two boys in the family. Cousin brought the news to the children before they mother reached home. They all missed their father very much, but shortly after their father died, the mother began to think of the yellow house in Beulah. she sent gilbert to see if it was still empty. and if he could find the owner of the house. to find out if they could live there.

The story is continued in this style in very fair English.

c. 3. Interpretation

A DAUGHTER OF THE RICH BY E. M. WALLER

It was in the country that this story began. It was the home of the Blossom's, a very merry home.

While they were merry and contented, in the city was a rich family who had a daughter, Hazel, who was not so happy. Her mother died when she was very young. Her Father did his best to take her place. But it seemed in vain.

When she was about sixteen she had a nervous brake down and afterwards she had to have her hair shaved off. She felt very badly for she had nice hair. So to cover it up she wore a skull cap. She was in Dr. Heath's care and the only thing to do was to send her to the country to get her health. . . . .

The day came and Hazel was to go home again. She hated to and they all were sorry to have her go. When she arrived at her home, she wrote them a wonderful letter and she told many people of her good times.

She was a changed Hazel, fat and rosy-cheeked. And she was happy again at home with her father.

The foregoing selections give a fairly good idea of the work of the girls, some of it badly written and showing not much comprehension of what had been read. Yet often there is found a

story fairly well expressed that indicates real appreciation of the contents of the book. As the work went on improvement in the reports could be seen in most cases. Some who wrote well in the beginning kept along about the same and showed little or no improvement. Those who did poorly at first did for the most part improve. Only a few became discouraged and dropped out.

A detailed study of the reports to note improvement was made for about 13 cases. Seven of these show decided improvement, three show no improvement because they wrote quite well at the start. Two show no ability and do not improve.

Some of the reports were in the form of answers to questions on the book read. For inasmuch as a number of the girls wrote to such great length, they found difficulty in following the main outline of the story. To make it easier for them a plan was adopted of letting those who had read twenty books and received their first honor certificate answer questions, five in number, about each book reported on. This plan seemed to work well. It cut down the amount written and made the girls think on some of the important points of the book.

The story of improvement is given for a few of the cases as follows:

Case A. The first thirteen reports show a couple of sentences copied out from each chapter of the book. In seventeen reports the girl uses the words of the book, but takes the book more as a whole than in previous reports, the story being still not finished generally. Finally a report appears in the girl's own words, very briefly told, the emphasis on unimportant details and the story not finished.

Case B. This girl's reports show a great improvement. There is one of the first type, ten of the second, three of type C a and twenty of C b. In the first two types the book was read with apparently no understanding of what it was all about. In the last type the book seems to have been understood and the reports are fairly well expressed.

Case C. The reports of this girl are given in her own words, type C throughout. In one report the main things in each chapter are written in her own words. In eighteen of the reports the events of the whole book are given with emphasis on detail and many unimportant things are told. They are long and simple sentences are often run together. Seventeen reports are those where questions are answered. In all of this

girl's work there is practically no improvement. She generally gets the story of the book pretty well.

Case D. This girl uses her own words throughout. Her later reports are superior to her early ones, but she evidently understood the books just as well at first. She just expresses herself better when regarding the book as a whole. Her summaries are very good.

Case E. This girl uses the words of the book largely. In her first reports she copies a few words from each chapter and never finishes all the chapters in a book. A second type shows that she evidently reviews the book as a whole, but copies sentences from the book running them together irrelevantly. Type A: Sometimes she begins with her own words, gives a few sentences and then uses the words of the book. One report shows type C where she uses her own words and views the book as a whole, though the sequence of events is somewhat mixed up. This particular report shows better understanding of the book though her English is poor, her sentences short and she deals with concrete material. In her question-answering reports she uses short sentences, generally answers the questions, but sometimes she tells things over twice as if she were not sure of the right answer. Taking it all together there is considerable improvement throughout her work. At first she could use no words of her own, but gradually began to be able to do so, and apparently began to understand her books better. This girl read forty books in all and received two honor certificates.

Similar records for the other cases could be cited.

A few selections from the girls' work to show improvement are as follows:

Case E.

SARA CREWE BY FRANCES HODGSON BURNETT

Chapter 1. Little Sara Crewe never went in or out of the house without reading that doorplate and reflecting upon it. By the time she was twelve, she had decided that all her trouble arose because, in the first place,

Chapter 2. "A most beautiful and promising girl, Captain Crewe. She will be a favorite pupil; quite a favorite pupil, I see." For the first year she was a favorite pupil; at least she was indulged a great deal more than was good for her. And when the select seminary went walking,

Chapter 3. "You are the only friend I have in the world," she would say to her. "Why don't you say something? Why don't you speak? Some time I am sure you could, if you would try. It ought to make you try, to know you are the only thing I have.

There follows other chapters, a few phrases from each in a similar way, the book not finished.

RAMONA BY HELEN JACKSON

THE STORY OF RAMONA

Once upon a time there live a little girl name Ramona She did not know who her mother was her father was dead and Ramona was adotp by the sister of Senora and then her sister sent her to live with Senora time. Ramona was only a little girl when she went to live with Senora and Felipe. And her sister sent her all of her jewels and told Senora not to tell Ramona anything intil she was twenty one years old. And Felipe had a sister name Margarita. And Felipe like Ramona very much. Their went to school together like each other very much. Her own mother was an Indian and her father was Scotchman name Anqua Phail. When she went to live with Senora it was time for them to sheep-shearing. Her father ask if she would take the offin and bring her up as her own child should be brought up. . . . .

Not all of this report is given as it is rather long. The girl seemed to understand this book better than her others; though her English is poor, it marks a step in advance.

Some other reports are quite well written and show much appreciation of the story. There is not so much evident improvement for inasmuch as they wrote fairly well at first there was not so much chance for improvement.

The following is a rather well expressed report, typed by the girl herself:

THE OTHER WISE MAN. (VAN DYKE)

You all know the story of the three wise men of the east. And how they saw the star and followed it. Well this story is one a little different from it.

When Augustus Caesar was master of the kings and Herod reigned in Jerusalem their lived in the city of Ecbatana among the mountains there lived a certain man named Artaban.

Around the dwellings where he was there was a fair garden and it descended from the slopes of mount Orontes it was made musical by the birds.

One day he stood in the doorway of this home—to meet the form of a man. He was dark and tall and was about forty. He was dressed in white wool with a cap of the same wool. Welcome he said in a low voice but in a pleasant one, peace be unto you.

There were nine of them dressed in different colors. They took their places about the alter where a burning flame was going. Then they said the hymn to Ahura Mazda. . . . .

He soon saw women coming the hill crying and making a great noise saying that the Soldiers are killing our children, The woman became quite frightened and rushed to hide her child for fear he might take it from her.

He stood at the door when the captain tried to cross the door way, but Artaban said I will give you this Ruby if you will leave me and my home in peace the Ruby looked good to him and he soon agreed to do it and gave the soldiers command to go on and they obeyed at once.

By this time he had given all his gifts away to save the child He soon heard of the robbers who were to be crucified.

His voyage soon came to an end and his gifts were accepted as well as the rest.

In order to gauge to some extent the kind of composition one might expect from children of the same mental age as these girls, through the kindness of Mr. Herman C. Knight, Superintendent of Schools of Belchertown and Enfield, an exercise in English was given to all the grades throughout one of his schools. This exercise was similar in purpose and the teachers were asked to have the children write a summary of some one of these books. The story was to be in the child's own words if possible. But if the child could not write the story in his own words he was told to take each chapter and write a few lines about it, telling what it was about. If the children could not frame sentences of their own, they were to be allowed to take some sentences from the book that would tell what the chapter was about, but they were to be encouraged as much as possible to make the summary in their own words. About four pages in writing was to be the usual length of the summary.

Since these summaries of the school children were written all at one time no estimate of improvement was possible. For the most part the children below the seventh grade used the words of the book. A few used their own words but did not generalize and gave only concrete details. The seventh grade children did a little better and several of them gave very good summaries of the books, using their own words, good English with sentences having clauses. But even with these there was no generalizing,

just one fact named after another. Several of them showed a good understanding of the book, though there was a tendency to use too much detail at the beginning and then to end the summary in a hurry. From this brief study of public school children's reports it would seem that not before the seventh grade could one expect work equal to the best that our girls produced.

An example of one of the best summaries by these school children is one by an eighth grade girl.

A Man Without a Country by Edward Everett Hale

Philip Nollen was the man without a country. Philip Nollen always said he hated his country and said this in every way he could. He was at a police station or some place where they asked him questions about his country he damned the United States. They said do you mean what you say. Philip said yes. They kept asking him, he kept saying yes.

After a long while they said. Do you mean what you said a long time ago. yes, was the answer.

They then decided to put him on the water. They told him his rules. They were.

1. He was not to read anything about America.
2. He could not have any letters from his parents or friends.
3. He could not here what the sailors said about America.

The main rule was, he could not see, read, hear, anything about America. Or the sailors could not mention anything about America near where he could hear. Neither could he talk or say things about their country.

The girl continues in the same style and uses for this report her own words for the most part. She got the main facts, used some sentences with phrases and clauses. Her punctuation on the whole is superior to that of the defective girls, but she lapses at the end into the words of the book.

Another measure of improvement was utilized in studying the effect of the reading done by the club girls. This was the vocabulary score and number of words given in three minutes in the Binet-Stanford test. Most of the girls of the club were tested either in 1925 or 1926, 15 in 1925 and 10 in 1926. These twenty-five were re-tested during October and November, 1928. As a control group fifteen girls of nearly the same life age and

mental ages were selected who had been living under similar conditions, most of them in the same building as the club girls, but who had not joined the club. This group had also been tested either in 1925 or 1926. The results of both Binet tests for the forty girls were analyzed and the following items were selected for the study of improvement: Vocabulary Score; Sixty Words in Three Minutes; Definitions of Abstract Terms; Memory Span, Digits Forwards and Digits Backwards; Score of Fable Test; Reasoning Tests, Arithmetical Reasoning (XIV–5), Problem of Boxes (XVI–4), Ingenuity Test (XVIII–6); Mental Age; and IQ.

Naturally this study lacks the precision of most of the psychological experiments, for the girls in the club were not all equally industrious and often some would drop the work to take it up again later. Also those not in the club often read on their own account, and one could not state definitely the exact amount of mental stimulation that each girl received. Yet, notwithstanding this lack of uniformity in the endeavor of the club girls, the results are more decisive than one might expect.

To bring out more clearly the effect of intensive reading the girls were arranged in two groups according to the length of time they were in the club and according to the number of certificates they had received. For Group I fifteen girls were selected who had been reading for at least fourteen months, and who had received at least five certificates (twenty-five books read). The maximum length of time was thirty months and the largest number of certificates received was eighteen (ninety books read). A second group was composed of ten girls whose range of attendance was nine to twenty-four months, range of number of certificates zero to four. Only one girl in this group had received five certificates, the reason for her being put in the second group being that she left the club early in its history and had showed decided lack of interest.

The average score for each of the items mentioned was computed for the three groups called Club I, Club II, and Non-Club. Then the two groups Club I and Club II were combined and the average score for each of the items was

TABLE 1

	VOCAB-ULARY 1	VOCAB-ULARY 2	GAIN	60—1	60—2	GAIN
Club I n-15	28.2	40.8	12.6	65.2	75.4	10.2
Club II n-10	26.6	34.3	7.7	51.6	60.8	9.2
Non-club n-15	30.9	36.4	5.5	61.9	61.9	0
Club I and II n-25	27.7	28.2	10.5	60.1	69.2	9.1
Total group n-40	28.95	37.57	8.6	60.8	66.7	5.9
Language handicap n-11	24	34.5	10.5	60.6	67	6.4
Italian girl	26	40	14	69	88	19
Polish girl	14	44	30	78	68	−10

	DEFI-NITION 1	DEFI-NITION 2	GAIN	D. FOR 1	D. FOR 2	GAIN
Club I	1.8	2.4	0.6	5.7	5.6	−0.1
Club II	1.5	1.8	0.3	5.4	5.5	0.1
Non-club	2.1	2.6	0.5	5.2	5.1	−0.1
Club I and II	1.6	2.1	0.5	5.6	5.5	−0.1
Total group	1.85	2.35	0.5	5.45	5.4	−0.05
Language handicap	1.7	2.3	0.6	5.3	5.3	0
Italian	1	3	2	5	5	0
Polish	2	3	1	6	5	1

	D. BACK 1	D. BACK 2	GAIN	FABLE 1	FABLE 2	GAIN
Club I	3.7	4.0	0.3	2.2	2.6	0.4
Club II	3.5	3.6	0.1	2.6	3.6	1
Non-club	3.4	4.1	0.7	1.9	1.8	0.1
Club I and II	3.6	3.8	0.2	2.3	3.0	0.7
Total group	3.57	3.77	0.2	2.2	2.57	0.37
Language handicap	3.6	4.1	0.5	1.2	1.7	0.5
Italian	3	5	2	2	5	3
Polish	3	4	1	1	0	1

	M.A. 1	M.A. 2	GAIN (MOS.)	IQ 1	IQ 2	GAIN
Club I	124.7 (10–5)	133.5 (11–7)	13.8	0.65	0.722	7.2
Club II	115.8 (9–8)	126.5 (10–7)	10.7	0.603	0.659	5.6
Non-club	121.2 (10–1)	130 (10–10)	8.8	0.63	0.678	4.8
Club I and II	121.1 (10–1)	133.3 (11–1)	12.2	0.631	0.696	6.5
Total group	121.1 (10.1)	132.1 (11–0)	11	0.661	0.6897	5.87
Language handicap	115.3 (9–7)	127.7 (10–8)	12.4	0.603	0.665	6.2
Italian	116 (9–8)	142 (11–10)	26	0.65	0.74	9
Polish	112 (9–4)	136 (11–4)	24	0.58	0.71	13

computed for this combined group of twenty-five girls, and finally the average score for each item was computed for the total group of forty. A group afterwards was made up of girls who were of foreign parentage and therefore suffered from a language handicap. This was irrespective of whether the girls were members of the club or not (see table 1). The individual score of 2 cases are added, one an Italian girl and one a Polish girl. These two girls in particular made remarkable gains.

We note that the improvement for vocabulary score is greatest for the group Club I, next for Club I and II, the third position is held by the Total Group, then Club II, and last is the group Non-Club. The order in improvement for "Sixty words" is Club I, Club II, Club I and II, Total Group, Non-Club.

The definitions of abstracts show very little gain, also the gain in memory span is very little for all the groups. The improvement in the fable test score shows the order: Club II, Club I and II, Total Group, Club I, Non-Club. The group Non-Club shows a loss rather than a gain, though the loss is slight. The non-club girls show the least improvement in all of these items.

The gain in the reasoning tests could not be estimated for a very interesting point appears, that is, there is hardly any success in these reasoning tests for any of the forty girls. The tests are those mentioned above. This is just what might be expected of a feeble-minded group. It is to be noted that though many of the advanced tests may be passed by some of the feeble-minded, it is not often that they succeed with the tests involving reasoning. It may be suggested in passing that this ability might better be used as the criterion for determining the feeble-minded individual rather than the tests that require training in language.

The only cases of success in the reasoning tests for the whole group of forty girls are the following: 1. A girl with IQ .95 (1928 test) belonging to group Club I succeeds with the ingenuity test (XVIII–6) on her second test. 2. A girl with IQ .75 (1928) also Club I, succeeds with the problem of boxes (XVI–4) on the 1928 test. 3. Another Club I girl, IQ .90

(1928) succeeded with the problem of boxes on the 1926 test and with all three reasoning tests on the 1928 test. 4. One girl of the Non-Club group, IQ .77 (1928), succeeds with the problem of boxes on the 1928 test. 5. Another non-club girl, IQ .82 (1928), also succeeds with the boxes. None of the group Club II have any success in reasoning. This makes one success on the earlier tests and seven successes on the 1928 tests for the whole group of forty girls, not a very large showing.

A point may be made here that whatever influence practice effect or coaching may have on the Binet test as a whole, no such effect is evident in the case of the reasoning tests. If the reasoning ability is absent there seems to be no way of training it in.

The order of gain for mental age is as follows: Club I, Club I and II, Total Group, Club II, Non-Club. The same order is found for the gain in IQ, as would be expected.

We find, however, that the group of girls who did not belong to the club improved the least in Vocabulary score, number of words given in three minutes, in mental age, and IQ, while the group designated as Club I comes out ahead in all of these items.

The group called Language Handicap, composed of girls of foreign parentage, improve in vocabulary score as much as the Group Club I and II, but do not equal them in the sixty word test. They run about the same as the other groups in definition of abstracts, in memory span, and in the fable test. In mental age and IQ they come out about the same as Club I and II again.

The Italian girl selected for individual study shows a gain of 14 in vocabulary score and 19 in the sixty word test. She also gains in definitions and in the fable test, but not so much in memory span, although in the digits backwards she goes from 3 to 5.

The Polish girl has a remarkable gain in vocabulary score, going from 8-year level to 12-year level, but does not do as well in the sixty word test. She improves a little in definitions and in digits backwards, does not do as well in the fable test. Both these girls show remarkable gains in mental age and IQ.

We should not regard it, however, that their IQ has really changed. It is only our judgment of it that has changed. The truth is that they must have been underestimated on the first test because of their lack of training in English.

The following conclusions may be deduced from this study:

1. Training in reading and book work affects the results of the Binet-Stanford tests.

2. Improvement in IQ is possible for some cases after the age of sixteen years.

3. The improvement in the case of the girls here studied is due more to changes in vocabulary score and understanding of language than to changes in memory span or reasoning ability.

4. Tests of reasoning ability would be of more value in the determining of feeble-mindedness than the tests involving the use of language.

5. Feeble-minded girls over sixteen years of age may be trained in reading and book work so that their use of language improves.

6. Many girls are called feeble-minded and sent to institutions on account of economic conditions or sex difficulties who do not test high because of lack of training in language, and such cases are improvable.

NOTES AND NEWS

May 13, 1929.

A CONTRIBUTOR'S EXPLANATION AND APOLOGY

PROFESSOR JAMES P. PORTER,
Editor Journal of Applied Psychology

Some time ago you called my attention to the identity in language between pages 127–8, Vol. X, No. 1, March 1926, issue of the JOURNAL OF APPLIED PSYCHOLOGY which was in my article, "Correctness of Judgments Based on Sensation Intensities and Time Allowed for Making Judgments" with Professor Edward B. Titchener's *Textbook of Psychology*, page 367. Since you were so good as to publish the article for me I feel that I am due you an explanation and an apology as an editor and to Professor Titchener as well for failing to mention his name as the author of the statement of the truth which my thesis confirms. In this part of my article I was stating the problem as I received it in a lecture by Professor F. A. C. Perrin in Experimental Psychology and out of which my experiment grew. You will notice a little further on words are in italics which means that the original ideas belonged to another than myself. In fact I meant to give my professor credit for the subject for investigation without ever noticing that he was quoting from another author. I am also due my professor an apology for using my notes from his lectures without giving authors due credit where credit was due. Yet I have the highest appreciation of the original as a fine statement of the truth my experiment demonstrated and I wish to give the author full credit for this important truth. I hope you will publish this letter as the best I can do to rectify the wrong of not mentioning the author of the idea my experiment investigated.

WALTER SCOTT MCNUTT,
Palmetto, Florida.

In the current *Review of Legal Education in the United States and Canada* by Alfred Z. Reed and issued by the Carnegie Foundation among other interesting items is found a warning against over-standardization. In his book *Present-Day Law Schools*, this author reaches the conclusion that the process of imitation and standardization, which has characterized the activities of reformers of legal education during the past forty

years may be carried too far. The present great need is for progressive differentiation rather than for standardization of legal education and of lawyers.

In the chapter on 'Bar Admission Requirements'' tables are presented which furnish a comparative view of the requirements now in force in each of the sixty American states or Canadian provinces. This is followed by a discussion of the essentials of a sound bar admission system.

The first International Congress on Mental Hygiene will be held in Washington, D. C., May 5–10, 1930, with Clifford W. Beers as Secretary-General and Dr. Arthur H. Ruggles, of Providence, R. I., chairman of the Committee on Organization of the Congress. The first Congress is being sponsored by a representative committee of mental hygiene experts, psychiatrists and educators from Africa, Australia, Belgium, Bulgaria, Italy, Japan, Spain and many other foreign countries. The program for the Congress will be in charge of an Executive Committee on Program headed by Dr. Frankwood E. Williams, Medical Director of the (United States) National Committee for Mental Hygiene. Information may be obtained by those interested from the offices of the Congress, 270 7th Avenue, New York City.

The National Conference of Social Work will hold its fifty-sixth annual meeting at San Francisco, June 26 to July 3, 1929. Among the topics to be discussed are the following: the relation of mental hygiene to our schools, problems to be solved jointly by the juvenile court and the schools, the attitude of teachers toward problem behavior, etc. Among the speakers are included William B. Munro of Harvard; Miriam Van Waters, referee of the Los Angeles Juvenile Court; Grace Abbott, chief of the United States Children's Bureau; Dr. Sheldon Glueck of the Harvard Law School and Porter R. Lee, director of the New York School of Social Work and president of the Conference.

Information may be secured by writing to 277 East Long Street, Columbus, Ohio.

This JOURNAL is pleased to announce the inauguration of a new quarterly international journal of Psychology. *The Revue de Psychologie Concrete* published its first issue in February of this year. Its editorial policy is to be very eclectic and readers are warned that if one or more of its issues defend any one point of view the trend of future contributions will not be necessarily foreshadowed thereby. Contributors are to have the freedom and responsibility of setting forth their own points of view.

Among the interesting contributions in the first issue are: C. Polit-

zer, Director, "Mythological and Scientific Psychology;" F. Giese (Stuttgart), "Theory and Practice in Psychology;" J. Kantor (Indiana, U. S. A.), "Organic Psychology;" A. Adler (Wien), "Fundamental Ideas of Individual Psychology;" and C. S. Myers (London), "Industrial Psychology in Great Britain."

Those interested should address *Les Revues*, 47, Rue Monsieur-Le-Prince, Paris, France.

Children, The Parents' Magazine has awarded its annual medal to Dr. Arnold Gesell, Director of the Psycho-Clinic, Yale University, in recognition of his book *Infancy and Human Growth* which was declared by the Board of Editors of the magazine "the outstanding scientific contribution to child development published during 1928." Six other authors received honorable mention.

Hon. George W. Wickersham announces the establishment of The Thomas William Salmon Memorial in recognition of the scientist who has made the greatest contribution in the fight against mental disease during each year. Awards are to be national and international and will provide for the wider dissemination of the knowledge of mental hygiene and insanity through cooperation with the New York Academy of Medicine, in whose hands the administration of the $100,000 fund is to be placed.

Professor J. H. White, Head of the Department of Psychology, University of Pittsburgh, in order to complete plans for the establishment of a division of research in personality problems at the University, has been granted release from his duties as head of the Department. Professor White who has directed the work of the Department of Psychology twenty-one years will retain his professorship in psychology. We have been informed that Professor W. T. Root will be promoted to the Headship of the Department.

The Bureau of Special Education and Psycho-Educational Clinic of Teachers College of Miami University announces courses to be given in Special Education during the first six weeks of the Summer Session, June 17 to July 27, under the direction of Dr. Mervin A. Durea, Executive Secretary of the Committee on Child Development, National Research Council, Division of Anthropology and Psychology. The Bureau will be moved to Ohio State University in the coming fall. However, a Department of Special Education is to be organized next year at Miami University and conducted under the direction of Miss Helen L. Mansfield.

A recent bulletin issued by The Daniel Guggenheim Fund for the Promotion of Aeronautics discusses the opportunities and requirements of those desiring to enter this rapidly expanding industry. There are four distinct classes of aeronautical education: aeronautic engineering, trade school instruction of a vocational nature, business administration in aeronautics and actual flying school training. At present there is a greater demand for graduates of the second, the trade school and vocational than for any other. A number of corporations indicate that they will need from 25 to 40 of these each year.

Attention is called to the fact that aeronautics is related to at least eighteen other subjects, psychology being one of them. It is a policy of the Fund to encourage just as broad a foundation as possible in the preparation of those who are contemplating aeronautic careers. It endorses heartily Colonel Lindbergh's brief statement of the basic factors in adequate flying school instruction as follows: 1. A definite standard of flying instruction; 2, state adoption of Federal flying regulations; 3, development of commercial training planes; and 4, suitable location of training field.

BOOK REVIEWS

BRUNO LASKER. *Race Attitudes in Children*. The Inquiry, New York. Henry Holt and Company, 1929. Pp. xvi + 394. $4.00.

The data for this study were obtained as the result of a questionnaire distributed to teachers, ministers, social workers and others who were in a position to use them in discussion groups. From the results of these, a preliminary report was drafted which served to stimulate further discussion. The reports of these discussions, together with illustrative material given by correspondents supplement the results from the questionnaire as original material for the book.

The viewpoint and purpose of the book can best be given by a quotation. The author says, "But this book is not primarily intended to give a 'fair' picture of the situation for general informative purposes. Its aim is to clarify the problem in such a way as to set out in high relief those aspects of the situation that seem to call for purposeful social and educational engineering."

The Inquiry, cooperating in the study, is a national organization for the promotion of cooperative studies of problems in human relations.

In the first section the race attitudes that children have are discussed. Fear, ridicule, condescension, class consciousness, etc., are related to race attitudes. Parts two and three deal with how these attitudes are acquired and how taught. Many subtle influences in home, school, church, on the playground, at the movies, etc., are indicated as having a direct bearing on racial attitudes. The following quotation from a colored correspondent is given in the chapter dealing with such influences in connection with geography teaching: "When I was about to finish the grades, we were studying the races of men in the geography class, and I remember distinctly the picture of the African savage that was used as our representative. I was quite innocent of the fact that I had the same racial lineage as he. Underneath the picture it said, 'Ethiopian—he belongs to the most backward race on the face of the globe'—and my white schoolmates turned around to me and said, 'Now, that's your folk.' Nothing else was said concerning Negroes in any textbook we used, except that they were slaves."

Similarly it is pointed out under "recreatonal influences" that in the movies the Negro seldom apears in any connection but one of comedy. Thus the attitude is engendered in the child that the Negro is a buffoon

and is not to be taken seriously. In the home the child may be told to wash the fruit before eating it, because dirty Italians have handled it. That there is no intentional propaganda back of these numerous influences the author readily admits, but holds that they are none the less effective.

The last section is on how race attitudes may be modified. Attitudes toward other national as well as racial groups are discussed throughout the book. Since the author admits that it is not his purpose to present a fair picture, there is little point in criticising the book on the grounds of being unscientific, which it seems to be. The truth seeking attitude is present, but with it the attitude of presenting certain aspects of the situation "in high relief." It is, however, a book that all who take democracy seriously, all who are really thinking about problems of race and class, will want to read.

AMOS C. ANDERSON,
Ohio University.

ARNOLD GESELL. *Infancy and Human Growth.* The Macmillan Co., 1928.

This treatise sets forth an extension of the methods employed in the study of child development presented in 1925 in the book *The Mental Growth of the Pre-school Child* by the same author. The results summarized in the present volume are the outgrowth of clinical observations on infant development under controlled conditions in the psycho-clinic at Yale University. Excluding the Introductory chapter which discusses the cycle of mental growth the book is divided into three parts. Part 1 treats the methods of observation in studies of infant development; Part 2 deals with genetic studies of infant behavior; And Part 3, the significance of infancy.

Part 1. While the author is often repetitious and devotes three of the five chapters to method (Comparative) used in making these observations on infant growth in the Photographic Observatory, nevertheless one is impressed with the description given and the cuts shown. Chapters 5 and 6 furnish the reader with data on comparative growth and behavior patterns of infant development at different age levels. Chapter 6 is especially valuable to the student of psychology for it presents normative summaries of infant reactions for each consecutive month from one to twelve; from twelve months to thirty norms are given only intermittently. The monthly increments taken on cases under observation are listed under the following behavior activities: Motor development; Language; Adaptive behavior; And Personal-Social behavior.

Part 2 contains nine chapters which deal with results of development studies made on, "over one hundred infants who were examined at repeated intervals to determine facts relating to tempo and trend of

development in each individual." More than five hundred individual development examinations were made four hundred and twenty five of which were studies of "mental growth". A comparison is made of the ninety mental growth studies on the following basis of their development status: Average; High average and superior; Low average and inferior; And subnormal. Tables and curves showing development will soon lead to a fair amount of predictability. Results of case studies of the normal, the retarded, the accelerated, the prematurely born, the postnatal born, and the effect on growth of glandular secretion and nutrition, twinning etc., are given. Much which should be of interest to students of infant life is to be found in this section of the book.

In Part 3 the author discusses the significance of Infancy and behind this discussion one is compelled to see the effect of the writer's broad clinical experience on what he has to say. The particular topics treated are the preeminence of human infancy, the potency of infant growth on personality, and the possible prediction value resulting from studies like the ones reported here. The closing chapters deal with the author's interpretation of growth as it is related to human life.

The diction and style of this book are not as lucid as one might want at times—nevertheless it should find a welcome place in the all too meager list of scientific studies, to date, on the subject of infant life.

JAMES R. PATRICK,
Ohio University.

DONALD G. PATERSON AND I. EMERICK PETERSON. *Athletics and Scholarship.* Research Bulletin 1. University of Minnesota, 1928. 16 pp.

The authors have made a study of "the admittedly unsatisfactory adjustment of large numbers of incoming freshman athletes." A comparison with a control group" shows that the football squad is definitely inferior in scholarship to the control group both in the fall quarter and the winter quarter." They then attempt to investigate several possible causes. The only discovery of interest is the finding that the members of the football squad who practiced fewer than 25 times had a poorer scholarship average than those who practiced more than 25 times. They conclude from this that "here is unmistakable evidence that time devoted to practice does not interfere with successful scholarship. Indeed it is accompanied by greatly improved scholarship." However they seem to have taken no account of injured men who have been unable to practice 25 times and probably unable to attend classes for the same reason. A comparison of the football squad with the control group in a variety of social characteristics show no differences worthy of mention. The final summary of the whole matter is that "there is every reason to believe, therefore, that no influences are at work to produce anything but a

legitimate student enterprise entirely in keeping with the intellectual and academic purposes for which the University is maintained." However the reviewer is still anxious to know why the football squad has a lower scholastic average than the control group, and until he knows the answer to this question he cannot say "amen" to the enthusiastic endorsement of football which the authors make.

E. K. WICKMAN. *Children's Behavior and Teachers' Attitudes.* Commonwealth Fund Publications, New York City, 1928. Price $2.00.

We have had many studies of the behavior of children. This study is one of the behavior of the teacher. The author points out that most misbehavior is of a social nature and therefore the setter of social standards is as much worthy of study as are the breakers of the standards.

The study has for its purposes the discovery of the relative seriousness of different offenses in the minds of teachers, what behavior they consider as offensive, the comparison of these ratings of behavior with similar ratings made by mental hygienists, and other points which the review will not treat. A considerable number of teachers were studied and the author has discovered the attitudes of teachers in general toward misbehavior. Offenses most serious in the minds of teachers are those against property, sex, truth, etc. Next in order are those which militate against the successful performance of scholastic work. Least serious are the types representing withdrawal such as shyness, sensitiveness, etc. Obviously teachers regard aggressive offenses as more serious than regressive defences. A correlation of practically zero exists between the ratings of teachers and the ratings of mental hygienists. The apparent cause of the differences between the ratings is due in large part to the fact that the teacher regards the child as a citizen of the school while the mental hygienist regards him as a citizen of the world. Apparently the whole child has not yet begun to attend school. The author opens a possible method of attacking the peculiarities of the individual teacher's discipline by showing that occasional teachers seem to have but one type of offense in mind when asked to write down a list of misdemeanors. The obvious need for a reorganization in the mind of the teacher as to the seriousness of various offenses is shown. In addition the author points out the need for removing the teacher's own personality from the problem of discipline, and relates the teacher's attitude toward discipline to the general problem of mental hygiene.

The study is not a highly statistical one and yet it is done with care. It is a worthy addition to the already excellent list of researches and studies published by the Commonwealth Fund.

STUART M. STOKE,
Ohio University.

NEW BOOKS AND PAMPHLETS RECEIVED*

Books and pamphlets for review should be sent to James P. Porter, Department of Psychology, Ohio University, Athens, Ohio.

Child Labor. GERTRUDE FOLKS ZIMAND, Editor. National Child Labor Committee, 215 4th Avenue, New York City. 39 pp.

Community Conflict. E. C. LINDEMAN. The Inquiry, 129 E. 52nd Street, New York City, 1929. $1.50. 176 pp.

Educational Achievement of Problem Children. RICHARD H. PAYNTER AND PHYLLIS BLANCHARD. Commonwealth Fund, Division of Publications, New York City, 1929. $1.00. 72 pp.

Introduction to the Study and Interpretation of Drama. J. W. KAISER. N. V. Swets and Zeitlinger, Amsterdam. 79 pp.

Pedagogical Value of the True-False Examination. A. W. COCKS. Warwick and York, Baltimore, Md., 1929. $2.00. 131 pp.

Personal Traits and Success in Teaching. ELIZABETH HUNT MORRIS. Bureau of Publications. Teachers College, Columbia University, New York City. $1.50. 75 pp.

Psychiatry in Industry. V. V. ANDERSON. Harper & Brothers Publishers, New York. 1929. $4.00. 364 pp.

Scientific Method. TRUMAN L. KELLEY. Ohio State University Press, Columbus, Ohio. 195 pp.

La Theorie du Savior dans la Philosophie d'Auguste Comte. MICHEL UTA. Librairie Felix Alcan. Paris. 30 fr. 286 pp.

Value of Homogeneous Grouping. T. LUTHER PURDOM. Warwick and York, Baltimore, Md., 1929. $2.00. 99 pp.

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* Mention here does not preclude further comment.

Directory of American Psychological Periodicals (*Continued*)

Journal of Personnel Research—Baltimore: Williams & Wilkins Co. Subscription $5.00. 500 pages approximately. Edited by Walter V. Bingham, and Clarence S. Yoakem. Bi-Monthly.

Genetic Psychology Monographs—Worcester, Mass.: Clark University Press. Subscription $7.00 per volume. Two volumes per year, 600 pages each. Edited by Carl Murchison and an international co-operating board. Monthly. Each number one complete research. Child behavior, differential and genetic psychology. Founded 1925.

Psychological Abstracts—Princeton, N. J. Subscription $6.00. 600 pages ann. Edited by W. S. Hunter. Monthly. Abstracts of psychological literature. Founded 1927.

Mental Measurement Monographs—Baltimore: The Williams & Wilkins Company. Subscription $5. 400 pages annually. Founded 1925. Edited by Knight Dunlap and Buford Johnson. Published without fixed dates, each number a single research.

Studies in Psychology and Psychiatry—Baltimore: The Williams & Wilkins Company. Subscription $5. 400 pages annually. Founded 1926. Edited by Edward A. Pace. Published without fixed dates, each number a single research.

Journal of General Psychology—Worcester, Mass.: Clark University Press. Subscription $7. 600–700 pages annually. Edited by Carl Murchison and an international co-operating board. Quarterly. Experimental, theoretical, clinical, and historical psychology. Founded 1927.

Directory of American Psychological Periodicals

American Journal of Psychology—Ithaca, N. Y.; Morrill Hall.
Subscription $6.50. 600 pages annually. Edited by M. F. Washburn, K. M. Dallenbach, M. Bentley, E. G. Boring. Quarterly. General and experimental psychology. Founded 1887.

The Pedagogical Seminary and Journal of Genetic Psychology—Worcester, Mass.: Clark University Press. Subscription $7. 700 pages annually. Edited by Carl Murchison and an international co-operating board. Quarterly. Child behavior, differential and genetic psychology. Founded 1891.

Psychological Review—Princeton, N. J.: Psychological Review Company. Subscription $5.50. 480 pages annually. Bi-monthly. General. Founded 1894. Edited by Howard C. Warren.

Psychological Bulletin—Princeton, N. J.: Psychological Review Company. Subscription $6.00. 720 pages annually. Psychological literature. Monthly. Founded 1904. Edited by Samuel W. Fernberger.

Psychological Monographs—Princeton, N. J.: Psychological Review Company. Subscription $6.00 per vol. 500 pp. Founded 1895. Ed. by Raymond Dodge. Published without fixed dates, each issue one or more researches.

Psychological Index—Princeton, N. J.: Psychological Review Company. Subscription $4.00. 300–400 pp. Founded 1895. Edited by W. S. Hunter. An annual bibliography of psychological literature.

Journal of Philosophy—New York; 515 W. 116th St.
Subscription $4. 728 pages per volume. Founded 1904. Bi-weekly. Edited by F. J. E. Woodbridge and Wendell T. Bush.

Archives of Psychology—Sub-Station 84, N. Y.: Archives of Psychology. Subscription $6. 500 pp. ann. Founded 1906. Ed. by R. S. Woodworth. Published without fixed dates, each number a single experimental study.

Journal of Abnormal Psychology and Social Psychology—Albany, N. Y. Subscription $5. Boyd Printing and Publishing Co. Edited by Morton Prince in co-operation with Floyd H. Allport. Quarterly. 432 pages annually. Founded 1906. Abnormal and Social.

Psychological Clinic—Philadelphia: Psychological Clinic Press. Subscription $2.50. 288 pages. Ed. by Lightner Witmer. Founded 1907. Without fixed dates (9 numbers). Orthogenics, psychology, hygiene.

Training School Bulletin—Vineland, N. J.: The Training School. Subscription $1. 160 pp. ann. Ed. by E. R. Johnstone. Founded 1904. Monthly (10 numbers). Psychology and training of defectives.

Comparative Psychology Monographs—Baltimore: Williams & Wilkins Co. Subscription $5. 500 pages per volume. Edited by W. S. Hunter. Published without fixed dates, each number a single research.

Psychoanalytic Review—Washington, D. C.: 3617 10th St., N. W. Subscription $6. 500 pages annually. Psychoanalysis. Quarterly. Founded 1913. Ed. by W. A. White and S. E. Jelliffe.

Journal of Experimental Psychology—Princeton, N. J. Psychological Review Company. 500 pages annually. Experimental. Subscription $6.00. Founded 1916. Bi-monthly. Ed. by Madison Bentley.

Journal of Applied Psychology—Baltimore: The Williams & Wilkins Co. Subscription $5.00. 400 pages annually. Founded 1917. Bi-monthly. Edited by James P. Porter, Ohio University, Athens, Ohio.

Journal of Comparative Psychology—Baltimore: Williams & Wilkins Co. Subscription $5. 500 pages annually. Founded 1921. Bi-monthly. Edited by Knight Dunlap and Robert M. Yerkes.

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